AMD Phenom 9900 | Dell UltraSharp 3008WFP | Asus EN8800GTS TOP

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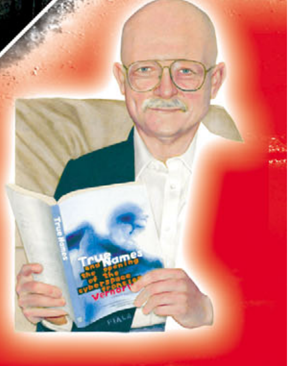

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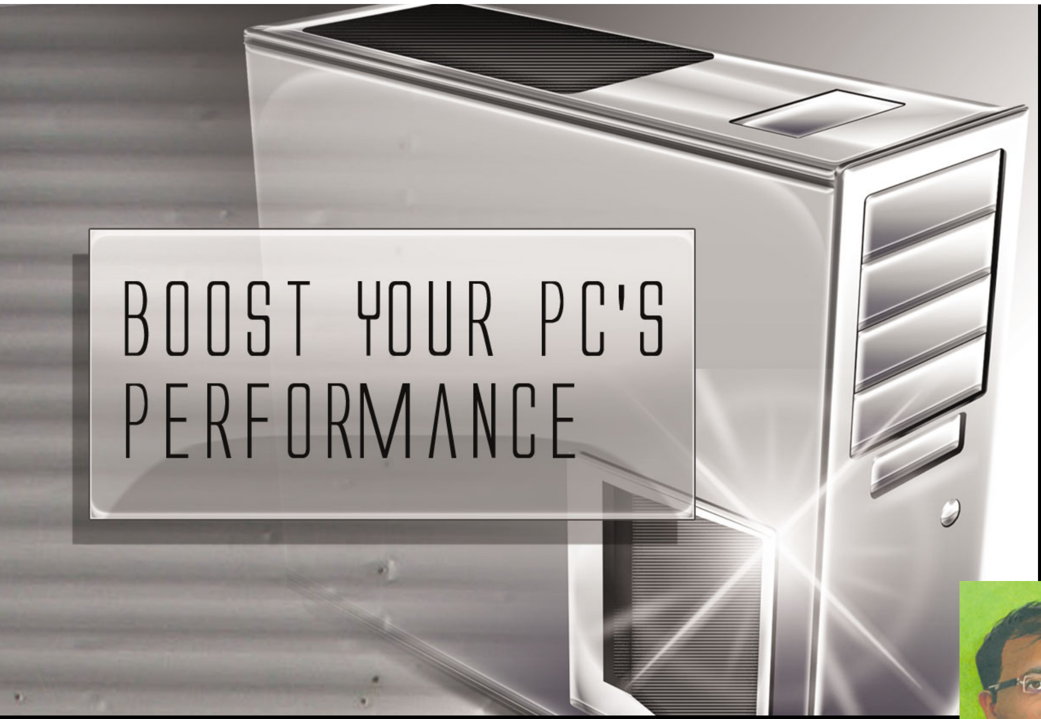

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EDITOR'S NOTE

And so, the eternal quest for better performance continues. As PC enthusiasts, we spend an awful lot of time tweaking, patching, flashing, reinstalling, uninstalling, reconfiguring, disconnecting and reconnecting, and so on. If my PC had a main deflector array, I'd no doubt have Geordi reconfigure it to bypass the negative power coupling and form a feedback loop so it could emit an inverse tachyon pulse. Or something.

Non-enthusiasts, of course, look on our constant tinkering as nothing short of madness. They want PCs that work well enough to get by without the hassle of *doing* anything to them. They don't understand why we're so gung-ho for a clean Windows install, or why five more frames per second is worth two or three hours of our time.

Of course, these very same people are happy enough to have us up to our elbows in *their* PCs when things go pear-shaped. When the 13,000 files they've lazily drug onto their Desktop and left there start to bog things down, or when the 72 programs with tendrils wrapped firmly around their startup process choke the life out of their system. But that's a rant that's best left for another day; the important thing is that we know why we do the things we do, and we enjoy doing them.

That's why, as we do every now and again, we've compiled several pages of tips you can use to help get your rig running like a champ. Check 'em out starting on page 56.

Also this month, we review several new video cards powered by AMD's Radeon HD 3800, we take a look at the latest rev of Dell's flagship monitor, we review two new AMD Phenoms, and much, much more. We even give away our Game of the Year award in the At Your Leisure section, which starts on page 90, so there's a lot to see and do this issue. Hope you enjoy yourself, and we'll see you again next month.

Engage!

Chris Trumble, Publication Editor, *CPU*

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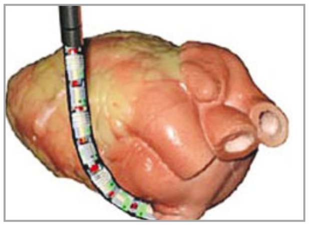
Compiled by Blaine Flamig

A Wonderful Guitar Hero III Christmas

Amazon.com reported post-Christmas that it moved 17 Wii consoles per second when in stock. More insane, however, was the reported $9,100 a Canadian man garnered on eBay from an Australian buyer for a copy of Guitar Hero III. The Canadian seller, who kept his identity private, said he purchased the game for his 15-year-old son as a Christmas present but snatched it away after finding the kid in the backyard smoking "funny" cigarettes. Perhaps drugs and rock and roll don't mix after all.

Remember, kids, Guitar Hero III is just a game and not an excuse to act like a real rock star.

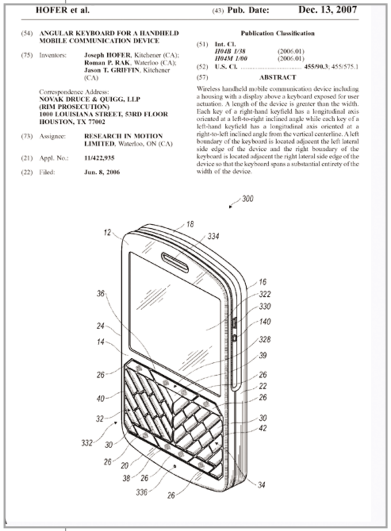
A Surgical Robot With Slithery Charm



The name could use some surgery of its own, but the i-Snake surgical robot that researchers at Imperial College London are developing could eventually help surgeons perform procedures that are cheaper, faster to recover from, and leave smaller scars (if any at all). The team recently secured $4.5 million to construct and test the flexible robots, which consist of a longish tube equipped with sensors, motors, imaging tools, and more. According to Lord Ara Darzi, health minister and surgeon, "The cost benefits that i-Snake will introduce include earlier, cheaper, and less invasive treatment; faster recovery and procedure times; and intangible benefits through an increase in patient care and quality of life." Something tells us Indiana Jones would rather keel over.

RIM Innovates On The Mobile Keyboard

BlackBerry users may be in for a rude, yet healthy, awakening if RIM follows up on a patent application (Angular Keyboard For A Handheld Mobile Communication Device) it filed at 2007's end with the U.S. Patent and Trademark Office. The patent focuses on a new keyboard design that would angle the keys on a mobile device at 45 degrees in an effort to make thumb typing easier. The patent doesn't specifically reference the BlackBerry, but an included image strongly resembles the massively popular device (reportedly now more than 12 million users worldwide as of December).



HOFER et al. (43) **Pub. Date:** **Dec. 13, 2007**

(54) **ANGULAR KEYBOARD FOR A HANDHELD MOBILE COMMUNICATION DEVICE**

(75) Inventors: **Joseph HOFER**, Kitchener (CA); **Roman P. RAK**, Waterloo (CA); **Jason T. GRIFFIN**, Kitchener (CA)

Correspondence Address:
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(73) Assignee: **RESEARCH IN MOTION LIMITED**, Waterloo, ON (CA)

(21) Appl. No.: **11/422,935**

(22) Filed: **Jun. 8, 2006**

Publication Classification

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H04B 1/38 (2006.01)
H04M 1/00 (2006.01)

(52) **U.S. Cl.** **455/90.3**; 455/575.1

(57) **ABSTRACT**

Wireless handheld mobile communication device including a housing with a display above a keyboard exposed for user actuation. A length of the device is greater than the width. Each key of a right-hand keyfield has a longitudinal axis oriented at a left-to-right inclined angle while each key of a left-hand keyfield has a longitudinal axis oriented at a right-to-left inclined angle from the vertical centerline. A left boundary of the keyboard is located adjacent the left lateral side edge of the device and the right boundary of the keyboard is located adjacent the right lateral side edge of the device so that the keyboard spans a substantial entirety of the width of the device.

Waterfall Audio Makes A Splash

We've done a little window-rattling with our stereo systems over the years, but French speaker maker Waterfall Audio's new handmade, transparent-glass Victoria Evo and Iguascu Evo systems give this a whole new meaning. Set for introduction at CES in January 2008, the 34-inch, two-way, three-driver Iguascu is expected to go for $3,900 a pair and the 40-inch, three-way, four-driver Victoria for $5,400 a pair when they ship here by March. Both will reportedly include the company's patented Acoustic Damping Tube technology, which "guarantees a quick, sharp bass and a midrange reproduction without any coloration."

Hardware Mole

Nokia Siemens Networks Gets Speedy

Nokia Siemens Networks stated in mid-December it achieved peak mobile data rates of 173Mbps during real-world tests of its LTE (Long Term Evolution) wireless technology. Testing involved using the 2.6GHz spectrum, a prototype base station (2x2 MIMO antenna system) atop the Heinrich Hertz Institute in Berlin, multiple-user connections, and terminals in vehicles driven up to 1km from the station. Nokia Siemens Networks' CTO Stephan Scholz stated, as we move toward a vision of 5 billion people connected by 2015, "Mobile operators will need to use all of the available spectrum with minimum network complexity and maximum cost efficiency to handle a 100-fold increase in traffic."

Asus Does The Ecosystem A Favor

Given enough time, we'd like to think the professor could have fashioned a PC similar to Asus' Eco Book to help get Gilligan and the gang off the island. Though still a prototype, the Eco Book's case is not only constructed of laminated bamboo strips, but they come in different shades. Obviously, whether bamboo can hold up to laptop-related heat is a major concern, but as Asus points out, bamboo is far less harsh on ecosystems than plastics. "Originally we came out with a leather model style-book. It was very popular," says Cher Chronis, Asus director of marketing communication. "After that, it was kind of natural for us to experiment with other types of materials, so we decided to go green."

Not Exactly The Same Ole' Song

Here's some advice, unsuspecting consumer: When buying an MP3 player for a loved one, load it with music before handing it over. Such words of wisdom would have benefited a Tennessee man who gave his 10-year-old daughter an iPod for Christmas bought at Wal-Mart. Upon opening the gift, the daughter discovered naughty photos and songs with explicit lyrics the player's previous owner allegedly downloaded. "Within 10 minutes, my daughter was crying," Daryl Hill was quoted. Wal-Mart apparently offered to replace the player, but Hill is reportedly holding on to it while considering a lawsuit. Hmm.

Compiled by Dean Takahashi

Fresco Microchip Delivers High-Performance Hybrid Receiver Chip For Terrestrial & Cable TV

Fresco Microchip says its FM2050 single-chip demodulator can serve as a receiver chip for analog terrestrial TV, analog cable, or DVB-T digital TV broadcasts. The FM2050 uses the Toronto company's agile DSP architecture, which virtually eliminates part-to-part variation that is common in demodulators. That helps cut the cost of a system and simplifies design. Analyst Jon Peddie of Jon Peddie Research says the timing is good for the chip as consumers make the transition from analog to digital TV. The FM2050 with a silicon tuner enables a full, compact system but at low costs. The chip receives IF output directly from tuners and generates digital MPEG video streams or analog video as needed. ▲

Slow GPS Navigation May Become A Thing Of The Past

It's maddening to wait for your GPS navigator to boot up and then acquire contacts with multiple satellites. Sometimes you have to wait minutes for the whole process to happen, and that may mean you're driving the wrong way for a period of time. Now, Sirf Technology has come up with an InstantFixII, a way to speed the whole process of getting a fix to less than five seconds. Kanwar Chadha, vice president of marketing at the San Jose, Calif.,-based chip maker, says that the faster times will enable new location services that require fast navigation in order to be useful. The technology is based on patent-pending algorithms that enable the navigation device to predict the positions of visible satellites in the sky and then adjust as needed. The chip technology performs the calculations necessary without any need for network updates. Among the customers who will use the technology is Mio Technology, a maker of popular navigation devices. Typically, satellites broadcast their precise locations every 30 seconds. GPS receivers have to get this data from each satellite to fix location. Sirf's InstantFixII allows a navigation device to track satellites more quickly and with weaker signals. ▲

Watching The Chips Fall

Here is pricing information for AMD and Intel CPUs.

*Retail price
** Manufacturer's price per 1,000 units
Other current prices, if indicated, are lowest OEM prices available through Pricegrabber.com

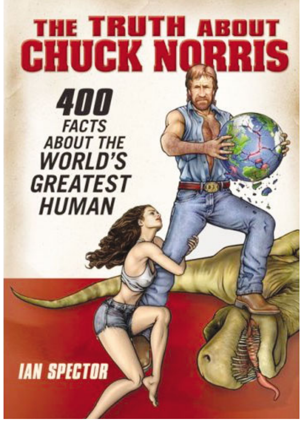
CPU	Released	Original price	Last month's price	Current price
AMD Turion TL-64 2.2GHz 1MB cache 1,600MHz HyperTransport bus	5/3/2007	$354**	$225	$217
AMD Athlon 64 X2 Dual-Core 5600+ AM2 only	12/12/2006	$505**	$138	$134
AMD Athlon 64 X2 Dual-Core 6000+ AM2 only	2/20/2007	$464**	$158	$153
AMD Athlon 64 X2 Dual-Core 6400+ AM2 only	8/20/2007	$251**	$179	$169
AMD Athlon 64 FX-70	11/30/2006	$599/pair	$323	$336
AMD Athlon 64 FX-72	11/30/2006	$799/pair	$330	$316
AMD Athlon 64 FX-74	11/30/2006	$999/pair	$319	$299
AMD Phenom 9500	11/19/2007	$251	$209	$251
AMD Phenom 9600	11/19/2007	$283	$245	$283
Intel Core 2 Duo Mobile T7100 1.8GHz 4MB cache 800MHz FSB	5/9/2007	$209**	$197	$197
Intel Core 2 Duo Mobile T7300 2GHz 4MB cache 800MHz FSB	5/9/2007	$241**	$209	$209
Intel Core 2 Duo Mobile T7500 2.2GHz 4MB cache 800MHz FSB	5/9/2007	$316**	$233	$233
Intel Core 2 Duo Mobile T7700 2.4GHz 4MB cache 800MHz FSB	5/9/2007	$530**	$322	$322
Intel Core 2 Extreme Mobile X7800	7/16/2007	$851**	$888	$851**
Intel Core 2 Duo E6540	7/16/2007	$163**	$256	$256
Intel Core 2 Duo E6550	7/16/2007	$163**	$166	$165
Intel Core 2 Duo E6600 2.4GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$316**	$199	$183
Intel Core 2 Duo E6700 2.66GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$530**	$319	$312
Intel Core 2 Duo E6750	7/16/2007	$183**	$189	$191
Intel Core 2 Duo E6850	7/16/2007	$266**	$270	$271
Intel Core 2 Duo X6800 2.93GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$999**	$910	$994
Intel Core 2 Quad Q6600	1/8/2007	$851**	$278	$274
Intel Core 2 Quad Q6700	7/16/2007	$530**	$537	$529
Intel Core 2 Extreme QX6700	11/14/2006	$999**	$799	$695
Intel Core 2 Extreme QX6800	7/16/2007	$999**	$1,042	$944
Intel Core 2 Extreme QX6850 3GHz 8MB cache 1,333MHz FSB 65nm	7/16/2007	$999**	$894	$944

NAND Flash Memory Continues Its Fast Growth In 2008

Intel, which makes NAND flash memory chips in a joint venture with Micron Technology, predicts that the $15 billion NAND flash market will continue its upward growth in 2008. Flash-based hard drive replacements are picking up steam, and NAND flash storage will become key to making ultra-mobile PCs more useful. Intel showed off a new flash chip that can store 2GB to 8GB in a space the size of a thumbnail. These chips will debut in various platforms next year. Intel says that flash is growing as a storage option in PCs because it has been getting faster; processors have gotten 30 times faster in a decade, but hard drives have only gotten 30% faster. In a demo, Intel showed that NAND flash-based laptops could finish a benchmark suite in 22 seconds vs. 53 seconds for a hard drive. Flash storage drives should hit 160GB in 2008, said Don Larson, product line manager. ▲

Compiled by Blaine Flamig

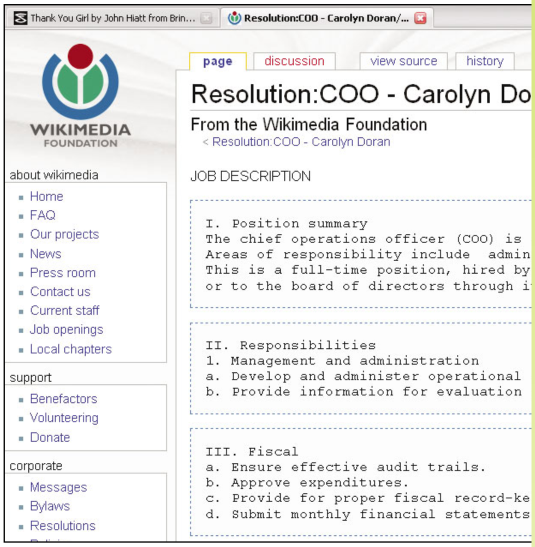
Chuck Norris Enters The Penguin


THE TRUTH ABOUT
CHUCK NORRIS
400 FACTS ABOUT THE WORLD'S GREATEST HUMAN
IAN SPECTOR

You might be afraid to admit it, but we aren't: "Walker, Texas Ranger" rules, and so does Chuck Norris, who has taken scores of judo chops to the neck over the years across the Web in the form of such "facts" as "Chuck Norris is a Mac, PC, Linux, and FreeBSD. But not Solaris." Apparently, a book that Penguin published in late 2007 from Ian Spector called "The Truth About Chuck Norris: 400 Facts About The World's Greatest Human" was one chop too many. Norris filed a lawsuit in a New York federal court seeking monetary damages from Penguin, citing, "Some of the 'facts' in the book are racist, lewd, or portray Mr. Norris as engaged in illegal activities."

Wikimedia Foundation's Background Check Gaffe

You have to admire Carolyn Bothwell Doran for working her way up the Wikimedia Foundation ladder from part-time bookkeeper to COO. The fine folks at *The Register*, however, turned up news in December on Bothwell that wasn't so inspirational, namely that she's been convicted of theft, drunken driving, and leaving the scene of a vehicle accident. Further, Bothwell, who served seven months in the big house, signed off on Wikimedia's tax return in March 2007 while still on probation. At press time, Wikimedia Foundation's most current audit was still incomplete, though Wikipedia's head honcho Jimmy Wales indicated he'd personally cover any losses that might surface.



Resolution:COO - Carolyn Do

From the Wikimedia Foundation

< Resolution:COO - Carolyn Doran

JOB DESCRIPTION

```
I. Position summary
The chief operations officer (COO) is
Areas of responsibility include  admin
This is a full-time position, hired by
or to the board of directors through i

II. Responsibilities
1. Management and administration
a. Develop and administer operational
b. Provide information for evaluation

III. Fiscal
a. Ensure effective audit trails.
b. Approve expenditures.
c. Provide for proper fiscal record-ke
d. Submit monthly financial statements
```

Think Secret Is No More

Nick Ciarelli, known to Apple rumormongers as Nick dePlume, was just 13 when he started Think Secret, a Web site devoted to spilling the beans on Apple-related releases. Now toiling away at Harvard, Ciarelli was hit with a lawsuit by Apple in 2005 after he published details on the Mac mini weeks before its launch and refused to give up his sources. In late December, Apple and Ciarelli reached an undisclosed agreement on that case that, unfortunately for Macheads the world over, will see Think Secret sail off into the great Web sunset in the sky ("As part of the confidential settlement, no sources were revealed and Think Secret will no longer be published.") Evidently, the hand that feeds. . .

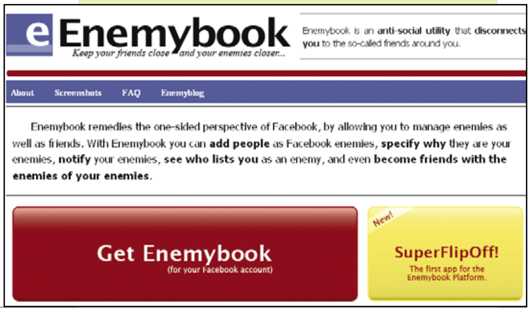
Site Seeing

Vienna Has More To Offer Than Sausage

Trust us, we know all about getting a tie for the umpteenth Christmas in a row. But that's not a problem now that city officials in Vienna have launched an online flea market at www.wien.gv.at/webflohmarkt/internet for Web citizens to sell, trade, or just give away the stuff they don't want any longer. Better, if you have requests for a particular piece of junk, you can make those, too. According to Ulli Sima, Vienna councillor for environmental issues, the aim of the virtual trading center is less real-world waste. Now, what will you give us for a never-worn, slightly hideous polka-dotted tie? ▲

There Are Many Enemies Among Us

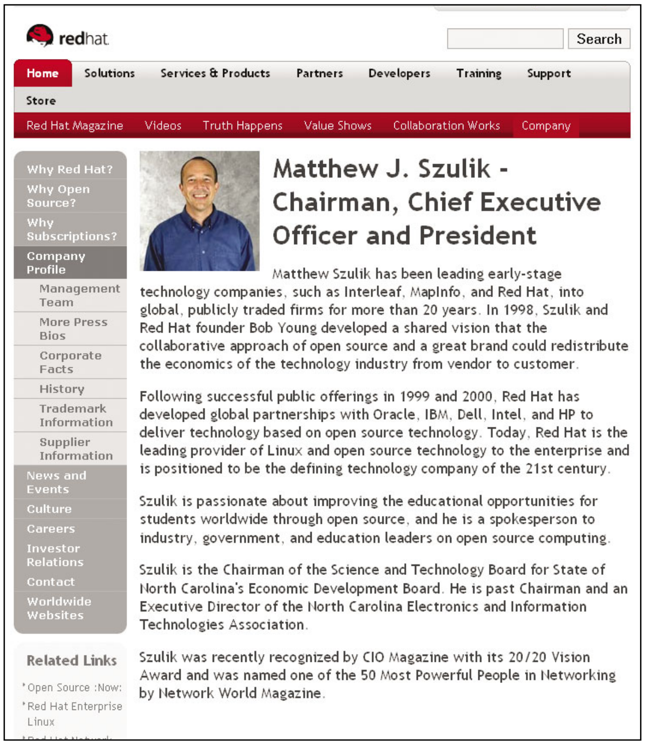
Tired of the phony-baloney friends you've amassed at Facebook? Give Enemybook a try (Keep Your Friends Close And Your Enemies Closer . . .). Created in July 2007 by MIT grad student Kevin Matulef, Enemybook is "an antisocial utility that disconnects you to the so-called friends around you." Matulef's brilliant approach already offers up a SuperFlipOff! app, Enemyblog (Matulef's musings on the degeneration of social networks), and more. So, who makes Matulef's enemy list? How about Mark Zuckerberg for starters? ("Facebook ruined Mark's and your relationship. You don't know Mark, but hate him already.") ▲


Enemybook
Keep your friends close and your enemies closer...
About
Screenshots
FAQ
Enemyblog
Get Enemybook
(for your Facebook account)
New!
SuperFlipOff!
The first app for the Enemybook Platform.

Enemybook is an **anti-social utility** that **disconnects you** to the so-called friends around you.

Enemybook remedies the one-sided perspective of Facebook, by allowing you to manage enemies as well as friends. With Enemybook you can **add people** as Facebook enemies, **specify why** they are your enemies, **notify** your enemies, **see who lists you** as an enemy, and even **become friends with the enemies of your enemies**.

Compiled by Blaine Flamig



Matthew J. Szulik - Chairman, Chief Executive Officer and President

Matthew Szulik has been leading early-stage technology companies, such as Interleaf, MapInfo, and Red Hat, into global, publicly traded firms for more than 20 years. In 1998, Szulik and Red Hat founder Bob Young developed a shared vision that the collaborative approach of open source and a great brand could redistribute the economics of the technology industry from vendor to customer.

Following successful public offerings in 1999 and 2000, Red Hat has developed global partnerships with Oracle, IBM, Dell, Intel, and HP to deliver technology based on open source technology. Today, Red Hat is the leading provider of Linux and open source technology to the enterprise and is positioned to be the defining technology company of the 21st century.

Szulik is passionate about improving the educational opportunities for students worldwide through open source, and he is a spokesperson to industry, government, and education leaders on open source computing.

Szulik is the Chairman of the Science and Technology Board for State of North Carolina's Economic Development Board. He is past Chairman and an Executive Director of the North Carolina Electronics and Information Technologies Association.

Szulik was recently recognized by CIO Magazine with its 20/20 Vision Award and was named one of the 50 Most Powerful People in Networking by Network World Magazine.

Red Hat CEO Takes His Leave

Citing personal reasons, Matthew Szulik stepped away from his post as Red Hat CEO in late December after nine years on the job. Szulik took Red Hat's helm in 1999 around the time the company went public. He'll turn the office over to Jim Whitehurst, former COO of Delta Air Lines. During his tenure, Szulik helped forge partnerships with Dell, Oracle, IBM, and HP. In a blog post on the decision, he wrote, "I take pride when customers and industry types comment to me that the people of Red Hat are 'different.' Not like the cylons who have come to dominate the industry of technology." Fortunately for Red Hat, Szulik won't drift far from the Red Hat family, as he'll become chairman of Red Hat's board of directors.

Don't Drink & Call Tech Support

Getting half-crocked on the hard stuff before calling a tech support call center might not be such a great idea in the future if software in development from Digital Technologies Corp. does what it's advertised to. As reported by *The Inquirer*, the software analyzes a caller's emotions, including surmising if he is mildly upset, stark-raving mad, or juiced up. From such analysis, the software assigns a number to the caller on a scale from one to seven, dividing calls into pleased and displeased categories. Having done a little tech support ourselves over the phone with irate and arguably "altered" callers, we're guessing No. 7s aren't going to get top priority.

Hear, Hear, Widex

We'll admit that we tune out a fair share of the press releases that cross our desk daily. Occasionally, however, something such as the INTEO from hearing aid maker Widex grabs our attention for its ability to enhance average joes' lives through technology. Specifically, Widex says the INTEO is the first hearing aid to use integrated signal processing, which is "not only like having a computer managing your hearing," but it's also like "having a second computer inside that watches the first one and works to make necessary adjustments." Specifications include a sound diary, speech and noise tracer, spatial feedback and sound tracer, 15 channels and 15 bands of hi-def sound processing, and enhanced dynamic range compression.

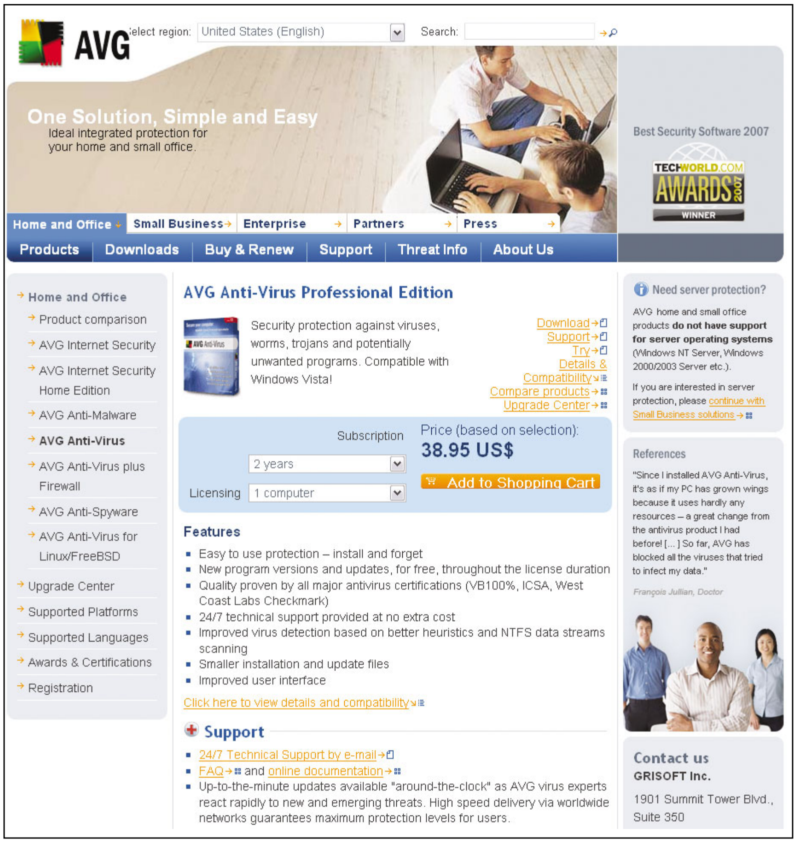
RIP Navigator, You Sailed The Web Well

We haven't used Navigator regularly in years. Still, it was difficult not to fight back a virtual tear or two when Time Warner AOL announced in late 2007 it will pull the plug on the browser that put the explosion in the Internet boom years. Navigator will remain available as long as users want to download it, but support, including development and security fixes, will stop Feb. 1. Released in 1994, Navigator was the first commercial browser. Additionally, Marc Andreessen and company's baby indirectly gave us Netscape, Mozilla, and more familiarity with Microsoft antitrust lawsuits than we ever bargained for.

Software Shorts

AVG Takes A Stand

Citing the Digital Millennium Copyright Act, AVG filed subpoenas against Microsoft, Google, Yahoo!, and GoDaddy in December in an effort to unearth search advertisers accused of fraudulently pimping AVG antivirus products via sponsored text ads. CEO J.R. Smith was quoted, "AVG was founded to protect the Internet community against cyber-threats, so we find it particularly disconcerting that criminal organizations are exploiting our good name for fraudulent purposes." He added, "Our goal is to locate and prosecute these criminal organizations to protect our users and the integrity of the Internet." Smith alleges those responsible attempted to use AVG's name to sell cracked and illegal apps. ▲



Ideal integrated protection for your home and small office.

AVG Anti-Virus Professional Edition

Security protection against viruses, worms, trojans and potentially unwanted programs. Compatible with Windows Vista!

Subscription: 2 years

Licensing: 1 computer

Price (based on selection): 38.95 US$

Features

- Easy to use protection – install and forget
- New program versions and updates, for free, throughout the license duration
- Quality proven by all major antivirus certifications (VB100%, ICSA, West Coast Labs Checkmark)
- 24/7 technical support provided at no extra cost
- Improved virus detection based on better heuristics and NTFS data streams scanning
- Smaller installation and update files
- Improved user interface

Click here to view details and compatibility

Support

- 24/7 Technical Support by e-mail
- FAQ and online documentation
- Up-to-the-minute updates available "around-the-clock" as AVG virus experts react rapidly to new and emerging threats. High speed delivery via worldwide networks guarantees maximum protection levels for users.

Need server protection?

AVG home and small office products **do not have support for server operating systems** (Windows NT Server, Windows 2000/2003 Server etc.).

If you are interested in server protection, please continue with Small Business solutions

References

"Since I installed AVG Anti-Virus, it's as if my PC has grown wings because it uses hardly any resources – a great change from the antivirus product I had before! [...] So far, AVG has blocked all the viruses that tried to infect my data."

François Jullian, Doctor

Contact us

GRISOFT Inc.

1901 Summit Tower Blvd., Suite 350

Is There Any Line Hackers Won't Cross?

Considering Hurricane Katrina, California's recent wildfires, and nearly any other devastating event haven't been off limits, we weren't entirely surprised hackers wasted no time to take advantage of the assassination of former Pakistani Prime Minister Benazir Bhutto in December. Maybe we just expect better. Regardless, just days after Bhutto's untimely death, hackers reportedly tweaked Javascript to steer users looking for more details of Bhutto's death to malicious sites that instead installed a Trojan, including the Worm_Hitapop.o and Troj_Agent.affr varieties. If we've said it once, we've said it a thousand times: If only they'd use their power for good. ▲

BIOS Upgrades Available Online

Compiled by Steve Smith

Before you send another motherboard to the landfill, consider upgrading the BIOS and giving your PC a new lease on life. Here are a few recently released upgrades. Readers can check out www.cpumag.com/cpumar08/bios to see our entire upgrade list.

Motherboard	Date Available	URL
ASRock ALiveNF7G-HDReady 2.00	12/20/2007	download.asrock.com/bios/AM2/ALiveNF7G-HDready(2.00).zip
Asus Eee PC 2G Surf 0129	12/20/2007	dlsvr03.asus.com/pub/ASUS/EeePC/EeePC2G/EeePC2G0129.zip
ECS 945GCT-M2 (PCB:1.x) 07/11/26	11/29/2007	www.ecs.com.tw/ECSWebSite/Downloads/DownloadFile.aspx?catid=1&driverid=3813&areaid=2&LanID=9
Gigabyte GA-G31MX-S2 F4	11/22/2007	america.giga-byte.com/FileList/BIOS/motherboard_bios_ga-g31mx-s2_f4.exe
Gigabyte GA-MA790FX-DS5 F3B	12/13/2007	america.giga-byte.com/FileList/BIOS/motherboard_bios_ga-ma790fx-ds5_f3b.exe
Shuttle SG33G5 SG33S112	12/12/2007	global.shuttle.com/servlets/download?file_id=10549
Shuttle SN68SG2 SN68SSOE	12/17/2007	global.shuttle.com/servlets/download?file_id=10634
SuperMicro H8QM3-2 2	9/11/2007	www.supermicro.com/support/bios/bios_zip/qm329077.zip

DIGITAL ECONOMY

Compiled by Steve Smith

The Job Search

Tired of the winter cold? Or have you just had it with the whole idea of winter? How about pursuing a tech career in a sunny climate that rarely dips below 60 degrees even in the depths of winter? Business Solutions Technologies, Inc., a Honolulu, Hawaii firm, is looking for a PeopleSoft Technical Consultant. BST supports human resources, benefits, and payroll departments, and they need techies experienced in Oracle's PeopleSoft product line. In addition to a working knowledge of PeopleTools and PeopleCode, you do need actual people skills.

BST seems to have a nice benefits package (insurance, matching 401K, 15 paid days off, and 10 holidays), but we are thinking that the real perk here is living in a paradise locale. With average temperatures ranging in the 70s and 80s most of the year, Hawaii is the only state in the United States. never to have recorded a temperature below zero.

seeker.dice.com/job-search/servlet/JobSearch?op=302&dockey=xml/a/6/a63afdeca625f8cdcd9b4690a7751eb0@endecaindex&source=3

30.7%

Percentage of U.S. households with DVRs (digital video recorders) in 2008 (Estimated)

eMarketer

29%

Percentage of people who use DVRs to catch up on missed TV episodes

Nielsen

82%

Percentage of digital video recorder users who skip TV commercials

ABI

7%

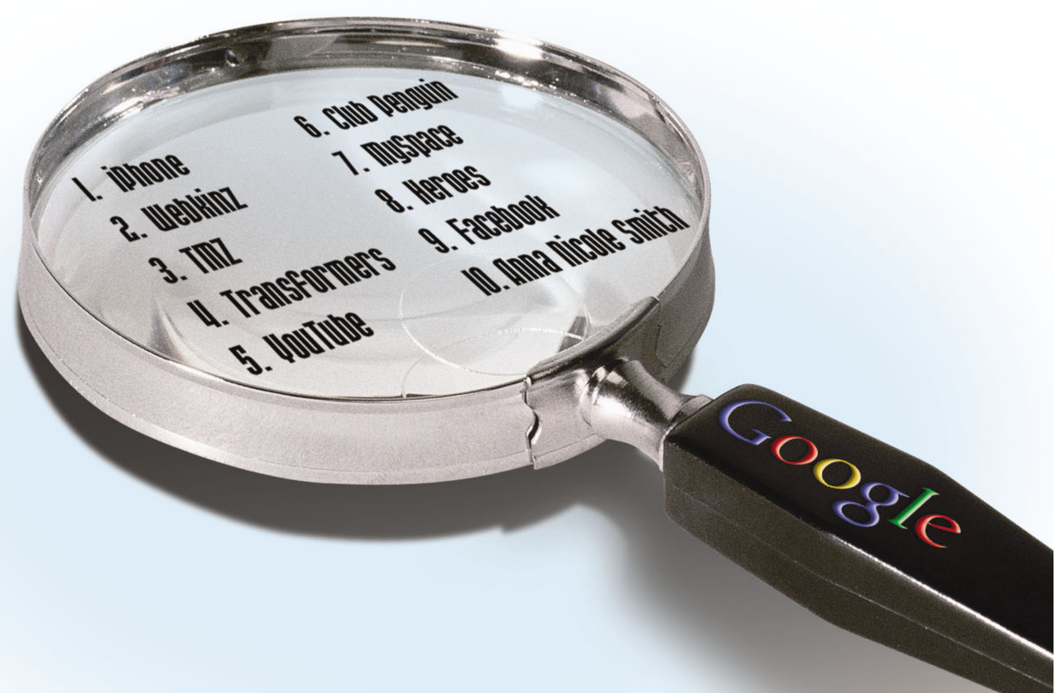
Percentage of people who watch missed TV episodes on the Internet

Nielsen

Fastest-Growing Search Terms, 2007

According to Google's list of fastest-growing queries in 2007, kids are joining Google's army of searchers, with virtual worlds Webkinz and Club Penguin both placing in the top 10 last year.

Source: Google
www.emarketer.com/Article.aspx?id=1005705



1. iPhone
2. Webkinz
3. TMZ
4. Transformers
5. YouTube
6. Club Penguin
7. MySpace
8. Heroes
9. Facebook
10. Anna Nicole Smith

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with too much time
on their hands?

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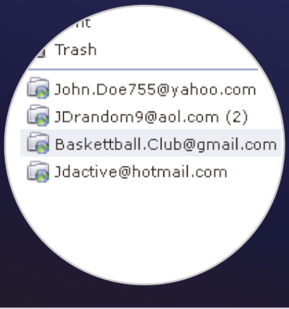

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Jdactive@hotmail.com

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ee webmail service and call it

Sarah McDonald	Got your message!	325 KB	10.34 a.m.
Kevin Smith	Dinner last night	116 KB	11:11 a.m.
Susan L. Moore	**How are you?**	**334 KB**	**11:18 a.m.**
Bob Jones	Baseball on Thursday	325 KB	11:40 a.m.
Peter Williams	Call me tonight	49 MB	11:52 a.m.
James Walsh	**How was your trip?**	**334 KB**	**01:41 p.m.**
Alex Miller	Shopping with mum	325 KB	02:08 p.m
Jennifer Moran	What´s up?	116 KB	09/26/07
Simon B. Miller	Good morning sweetheart	334 KB	09/26/07

From: Kevin Smith
Subject: Dinner last night
09/28/07 11:11 a.m.

Hi John,

I wanted to let you know that we changed our weekly gym training to Thursday nights. Meet us in front of the courts to start warming up at 7:30 – please be on time. If we want to win next month's tournament, we really need to focus and work hard.

If you can't make it, let me know by calling my cell.

Thanks, Mark

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The Saint

by Alex St. John

Better Ideas In Computing

Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades of the Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is president and CEO of WildTangent Inc., a technology company devoted to delivering CD-ROM-quality entertainment content over the Web.

When I was studying electrical engineering in college in the 1980s, I wanted to pursue a career in parallel super computer design. The field fascinated me because there are domains of computer science problems that are not simply faster to compute with parallelism but in some sense are also only solvable with extreme parallelism. In that era, parallelism in computing was thought of as an efficiency tool for managing a series of fundamentally serial computing problems, and that mindset persists to this day. Searching a large database for a specific entry and computing a large spreadsheet are very common serial computing problems. Yes, you can improve the performance of these kinds of computations by subdividing the serial processing work between multiple processing units, but solving serial problems with greater parallelism isn't breaking any interesting ground in computer science.

3D graphics is one of an infinite set of computing problems that involves computation in which the outcome of many simultaneously interacting forces must be computed to generate a "realistic" result. These problems are all highly recursive in nature, meaning you can't calculate a result for one pixel on the screen without calculating a result for all of them. If an arbitrary limit on the quality and detail of a 3D scene were not chosen for these problems, they would require infinite computation to solve. Most physics, chemistry, and interesting artificial intelligence problems involve this kind of computations and are inherently hard to solve or even approximate with a modern serial processing computer. It was an interest in these kinds of problems that led me to the videogame industry and resulted in my efforts at Microsoft to create Direct3D and use gaming to generate a consumer market for massively parallel 3D hardware acceleration.

The reason a GPU *vastly* outperforms the most advanced serial processing CPUs at rendering 3D graphics is that they are wildly parallel processing chips specifically designed to solve intrinsically parallel computing problems. A GPU doesn't have two or four cores; it has millions. The most powerful and complex computer we know of, the human mind, has much in common with modern GPU architecture. It is for these reasons that I've predicted in the past that the GPU will evolve to become dominant and the CPU will ultimately be relegated to the role of glorified I/O processor.

There are no interesting future computing problems that GPUs are not better suited to solving quickly. Recent advances in GPU architecture to increase the general-purpose programmability of each processing unit and enable support for complex floating-point math clearly shows the march of processing emphasis away from the CPU and onto the GPU.

Although Intel frequently exhorts developers to thread their programs to take advantage of its multicore architectures, this is a fundamentally crude and inefficient approach to better performance. Placing the burden on developers to make otherwise simple serial programs take advantage of a little more parallelism quickly makes software more complex and less stable. I observe that many of the security and stability problems we see in Windows today are the result of trying to force a fundamentally serial computing device to support an extremely complex real-time OS environment. These systems are too complex for our primate minds to grapple with; the result is an unwieldy abomination like Vista. The burden of benefiting from parallelism should be shouldered by the tools and the silicon, not passed off onto developers to cope with.

This progression toward smarter development tools and greater processing parallelism will lead us inexorably to intrinsically parallel programming languages that automatically "thread" code for us to take advantage of massively parallel processing chips like the GPU to solve a whole new domain of computer science problems that are unapproachable with the tools and CPUs we rely on today. For example, what is it about a human brain that enables it to self-program to begin with, and then to pass along that property to machines?

If Intel and AMD are smart, they'll put a GPU onto the CPU die ASAP or risk waking up one day soon to find that they've been displaced by Nvidia. ▲

Send your feedback to
thesaint@cpumag.com

DREAM HARDWARE

These Gizmos Don't Sing It, They Bring It

Let us make ourselves perfectly clear. We prefer our retro modern. We prefer sound systems that resemble car parts. Oh, and we like to drive underwater, too. We're makin' a statement, man.

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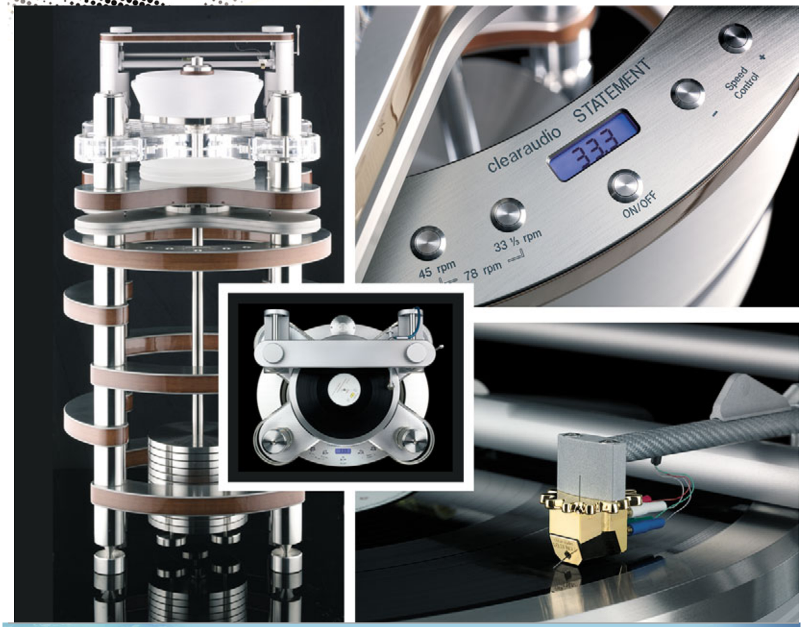
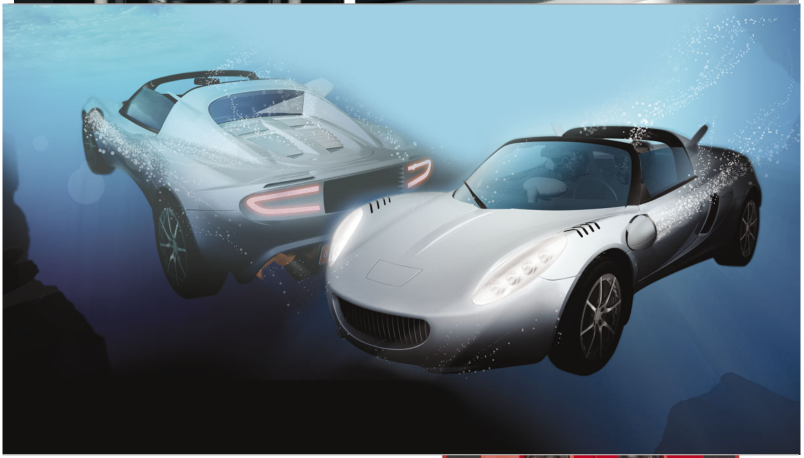
by Marty Sems



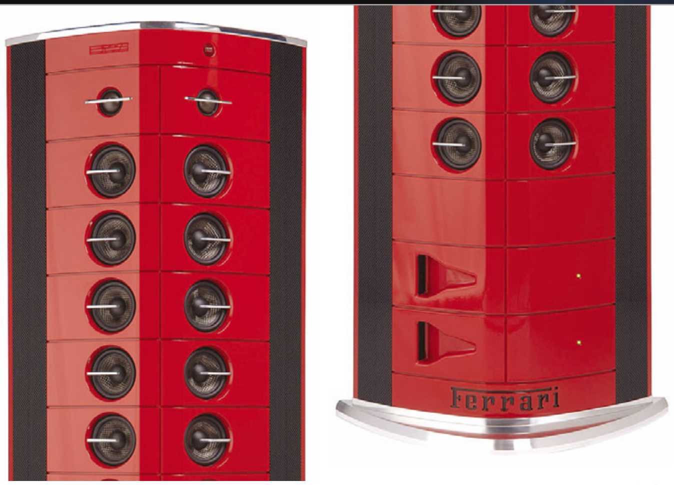
Clearaudio Statement

It may come as a shock, but the majority of people still listening to vinyl records aren't doing it to be thrifty. They reckon there is a higher level of audio quality to be found in this analog medium than in the digital world. Whatever your opinions on that subject (don't get us started), there's no denying the fascination factor of a really, really high-end turntable. German firm Clearaudio (www.clearaudio.de) has made a definitive Statement on the matter. Weighing a third of a ton and using an electric motor similar to the Mars Rover's, this gramophone's grammar is unimpeachable. Its diction is decisive due to its unique tangential tonearm, its enunciation exquisite because its dynamically balanced, magnetically floating acrylic platter is physically isolated from the drive mechanism. A massive 175-pound leveling pendulum damps any inducement to lisp. Clearaudio went on holiday before it could confirm to us the price of this in no way free speech, but we've heard whispers around the $109,000 mark.



Rinspeed sQuba

There is zero point in being fantastically rich if you can't buy one of these. Forget love, forget redemption—all else is as vapor once you behold the sQuba. And now you must despair, for you cannot own it at any price. Yup, it's an electric sports car. And yup, you can drive it underwater like a sub, down to 33 feet or so. With carbon nanotube body panels, twin jets to the fore, and dual screws aft, this one-off concept car from Rinspeed (www.rinspeed.com) features ScubaPro air supplies to keep the cabin comfortable under the sea. The company will unveil the sQuba at the Geneva Motor Show this month but says that no production model is planned. Don't forget to keep up the wax job.



DWV Art.Engine

Now hear this: If your blood jumps at the sound of horsepower, perhaps your wallet will leap at this wireless sound system styled like a Ferrari 16-cylinder (www.dwvartengine.com). This limited-edition piece of functional art stands 4 feet tall, machined from billet aluminum and appointed with licensed Ferrari hallmarks, such as the Start Engine button. ScanSpeak dome tweeters and carbon fiber mids/woofers seem kinda weighted toward the higher RPMs, er, frequency cycles, but we're sure there's some grunt down low, too. All these sonic ponies are yours, as soon as your $20,000 debit clears. ▲

R670 Arrives

AMD's Radeon HD 3800s Hit The Ground Running

For the past year and a half, the graphics race between AMD and Nvidia has produced more than just red and green smudges on the guardrails of the PC component industry, namely cheaper graphics cards for mainstream gamers. Nvidia's aggressively priced GeForce 8800 GT is the most recent evidence that, at least in the near term, it's taken a sharp turn into the midrange lane and stomped on the gas. Judging by last month's GeForce 8800 GT roundup, ATI will need more than just racing stripes and nitrous to defend its price/performance strategy and remain in the hearts, minds, and systems of average gamers.

Under the hood, the ATI Radeon HD 3800 series is little more than a die shrink of the Radeon HD 2000 series with a handful of extra features bolted on. Despite the minor changes, AMD has chosen to dispense with the XTX, XT, and PRO suffixes for naming each product in favor of a more transparent numbering system that denotes the generation, family, and variant. Among the Radeon HD 3800 series GPUs we tested, the HD 3870 and HD 3850 are roughly equivalent to the XT and PRO, respectively.

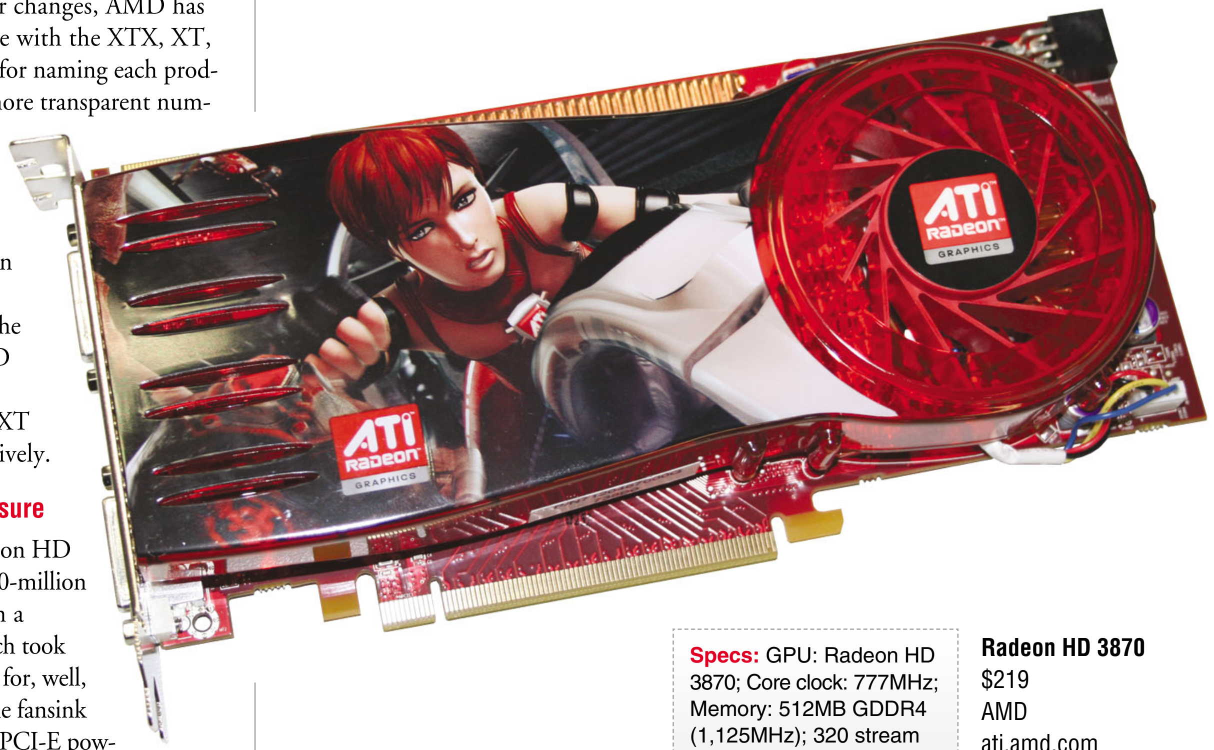
Cool Under Pressure

Last year's Radeon HD 2900 XT was a 700-million transistor beast on a 408mm^2 die, which took some heat from us for, well, being hot under the fansink and requiring two PCI-E power connectors to meet the card's 215-watt demands. For the 3800 series GPUs, ATI's engineers took a half-node step from the Radeon HD 2600 and 2400's 65nm process to deliver double the transistor density (666 million transistors in total) on a 192mm^2 chip. The resulting 55nm HD 3800 series graphics cards only require a single 6-pin PCI-E power connector.

The HD 3800 series GPUs are actually based on the HD 2600 and 2400 architecture, evidenced by the fact that they share the 256-bit memory bus (the HD 2900 XT has a 512-bit memory bus) and other R630- and R610-only features.

Another power-related improvement you'll find here is ATI's PowerPlay Technology, which is a carryover from the Mobility Radeon family. PowerPlay works by dynamically throttling GPU power depending on the 3D load. With the PowerPlay-deficient HD 2900 XT, the average power draw is maxed out regardless of whether you're playing the system-crushing Crysis or an old favorite such as Half-Life 2. The HD 3800 series, however, slashes power draw by as much as 50 and 66%, respectively, when you're performing general usage tasks or doing some light gaming.

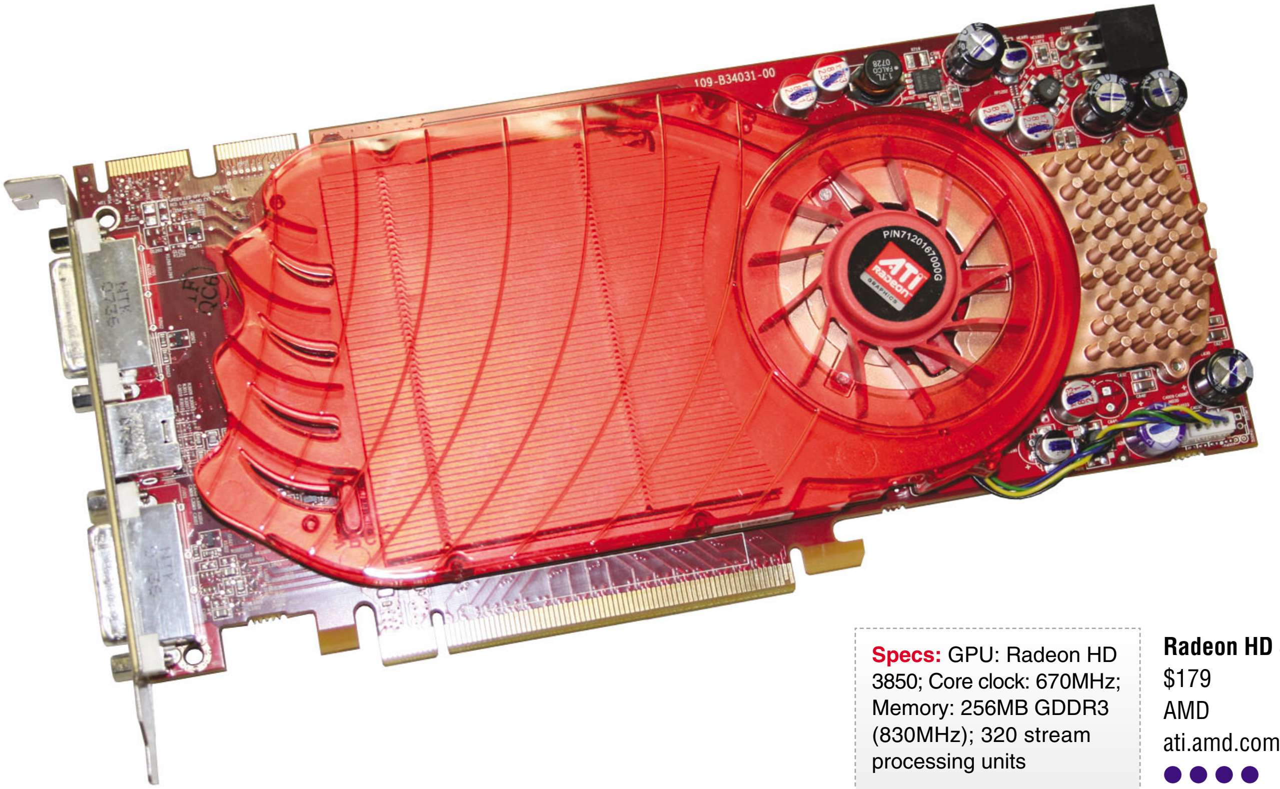
Unlike Nvidia's latest effort, the HD 3800 series GPUs support Microsoft's tweaked DX10.1 API, which is scheduled to appear at about the same time as Windows Vista's SP1 (possibly by the time you read this). DX10.1 brings with it Shader Model 4.1, global illumination effects, better antialiasing performance, and new HDR effects. You won't see



Specs: GPU: Radeon HD 3870; Core clock: 777MHz; Memory: 512MB GDDR4 (1,125MHz); 320 stream processing units

Radeon HD 3870
$219
AMD
ati.amd.com
●●●●◖

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**



Specs: GPU: Radeon HD 3850; Core clock: 670MHz; Memory: 256MB GDDR3 (830MHz); 320 stream processing units

Radeon HD 3850
$179
AMD
ati.amd.com
●●●●

game developers taking advantage of the updated spec for quite some time, and even then, most agree the improvements won't be revolutionary. Consider DX10.1 as a nice futureproofing add-on.

The 2D realm also sees marked improvements over the HD 2900 XT. The HD 3800 series graphics cards are currently the highest-end GPUs from ATI to include ATI Avivo HD dedicated UVD (Unified Video Decoder) hardware designed to handle the H.264, AVC, and VC-1 video decoding of Blu-ray and HD DVD video, leaving your CPU free to manage other, more appropriate, tasks. As with the rest of the R6xx-based GPUs, the 3800 series have the HDCP-compliant chips and encryption keys, as well as native support for audio and video over HDMI to play back protected HD content.

Specs: GPU: Radeon HD 3850; Core clock: 670MHz; Memory: 512MB GDDR3 (830MHz); 320 stream processing units

Ultimate HD3850 512MB
$299
Sapphire
www.sapphire.com
●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

The 3800 series reaps further benefits from its PCI-E 2.0 support. The spec is capable of delivering up to 16GBps of bandwidth per 16-lane link, which translates to improved gaming performance when the game resources, such as texture and vertex data, overflow to system memory. PCI-E 2.0 also ups the motherboard power output from 75 to 150 watts per slot.

With regard to multi-GPUs, ATI hasn't exactly been asleep at the wheel. Check out the "CrossFire X Factor" sidebar for more details.

AMD Radeon HD 3870

The R670 is most likely the final enthusiast product to come out of ATI's R600 family. Compared to the HD 2900 XT, the HD 3870 has a narrower 256-bit memory bus. The stock HD 3870 comes with a 775MHz core clock (the unit we tested actually clocked in at 777MHz) and 320 stream processors capable of nearly half a teraflop (497 gigaflops) of math processing. This GPU also features a full complement of 16 texture units and 16 render back-ends. The HD 3870's frame buffer consists of 512MB of GDDR4 memory clocked at 2.25GHz. Peak board power maxes out at a cool 105 watts.

We weren't able to procure any third-party HD 3870s in time for publication, but the units ATI sent us featured a dual-slot fansink covered in a Ruby-adorned, transparent red plastic shroud. The fan's whisper-quiet (for a graphics card) 34dBA rating was barely audible even under the heaviest of loads. The PCB measures just 9 inches long and features a lone 6-pin PCI-E power port. The bracket features two dual-link DVI ports and an HDTV-out port.

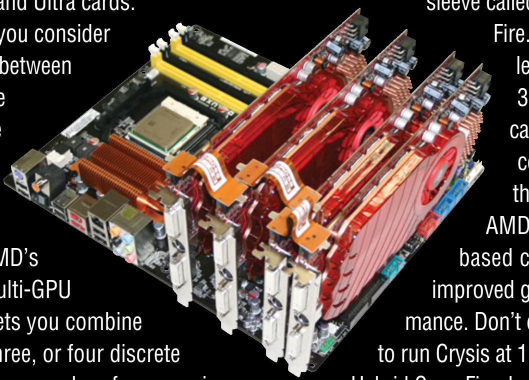
The HD 3870 performed rather well in the benchmarks, breaking 10,000 in 3DMark06 at default settings. Both S.T.A.L.K.E.R. and the DX10-patched Company of Heroes were playable at 1,600 x 1,200, but newer DX10 games such as Crysis and World in Conflict couldn't manage above 14fps at any resolution. Although Nvidia's 512MB GeForce 8800 GT outperforms the Radeon HD 3870 in most areas, ATI's option is a no-brainer for budget-conscious gamers.

AMD Radeon HD 3850

Like its more capable sibling, the HD 3850 features a 256-bit memory bus. The card also has 256MB of 830MHz GDDR3 memory, which is capable of up to 52GBps of bandwidth. The HD 3850 also shares the 3870's 320 stream processors, 16 texture units, and 16 render back-ends. The HD 3850's core clock is set to 670MHz and can churn out up to 428 gigaflops of mathematic processing.

CrossFire X Factor

Since the introduction of 3DFX's Voodoo 2 and the subsequent iterations from Nvidia and ATI, multi-GPU computing has been a rather controversial technology. Some enthusiasts argue that SLI and CrossFire are best suited to budget gamers who can only afford a single midrange card now but might want a performance boost down the road. Others look at the red and green teams' multi-GPU technologies as the best way to run the day's latest games with the highest resolutions and eye candy. As we went to press, Nvidia appears to have sided with the latter camp by announcing its three-way SLI platform designed for nForce 680- and 780-based systems and three GeForce 8800 GTX and Ultra cards. Alternatively, when you consider the price difference between the HD 3850 and the 8800 GTX, you have to admit that ATI is bringing multi-GPUs to the people.



CrossFire X is AMD's new approach to multi-GPU computing, which lets you combine the power of two, three, or four discrete graphics cards for improved performance in games and 3D applications. Part of the reason we haven't seen a viable quad-GPU setup since the GeForce 7950 GX2 was due to DX9's inability to support AFR (alternate frame rendering) for more than three frames at a time. That limitation just isn't a factor for DX10, and ATI is the first to take full advantage of this quad-GPU rendering feature. The new scheme also lets each of the four graphics cards drive two monitors, for a total of up to eight monitors.

The new technology doesn't require any proprietary core logic on the chipset side of the system, but rather relies on an integrated compositing engine in the GPU and a new dual-channel bridge connector. As a result, CrossFire X should, at least in theory, work with any chipset that supports PCI-E lane switching, opening it to both Nvidia platforms and Intel's new P45 chipset. As we went to press, the Catalyst drivers that support 3- or 4-way graphics cards hadn't been made available, but you should be able to dive in by the time you read this.

CrossFire X is only supported with the HD 3870, 3850, and the as-yet-unannounced HD 3870 X2 graphics cards. But ATI didn't forget the strapped-for-cash gamers of the world. The entry-level HD 3400s, which should be for sale by the time you read this starting at $50, have another multi-GPU trick up their collective sleeve called Hybrid CrossFire. This technology lets a discrete HD 3400 graphics card share processing time with the IGP found in AMD's new 790-based chipset for improved gaming performance. Don't expect to be able to run Crysis at 1,600 x 1,200 with Hybrid CrossFire, but you might see as much as a 130% performance boost in games compared to using the IGP alone and up to 70% compared to just using a single discrete HD 3400.

We had all the hardware to run CrossFire X in our test system, including the quad-PEG-slotted M3A32-MVP Deluxe motherboard, four HD 3850s (the PEG slots weren't spaced to accommodate four dual-slot graphics cards), and loads of dual-channel interconnects (though only three are necessary for 4-way CrossFire X). Unfortunately, driver support wasn't available as we went to print. But that didn't stop us from trying.

With the system set up, we enabled CrossFire from the Catalyst Control Center and

Unlike the HD 3870, the 3850 is a single-slot card. The cooler consists of a red plastic-shrouded fansink, which is rated to produce only 31dBA of fan noise. In our experience, this seemed right on target, even under load. The 9-inch-long slab of PCB is also red and features a single 6-pin PCI-E power connector. At 95W, the peak board power is only slightly lower than that of the HD 3870. The HD 3850's bracket has a pair of dual-link DVI ports and a port for an HDTV dongle.

In 3DMark06, the HD 3850 managed to score just 1,000 points below the HD 3870 at each resolution. The HD 3850 really shone in the benchmarks at our lowest benchmarking resolution, 1,280 x 1,024. In S.T.A.L.K.E.R., the card posted an impressive 41fps. The picture with DX10 games was rather less impressive, with only the patched version of Company of Heroes managing to be playable. At less than $180, the HD 3850 is a more than capable card for DX9 and some light DX10 gaming.

Sapphire Ultimate HD3850 512MB

The Sapphire Ultimate HD3850 has twice the dedicated memory compared to the stock HD 3850. The other—and more obvious—difference you'll notice is that Sapphire replaced the stock fansink with a Sherman tank-sized passive heatsink bristling with heatpipes. The heatsink extends about 1.25 inches above the PCB, and may result in some space problems for gamers with cramped cases.

In the benchmarks, the Sapphire Ultimate HD3850 consistently outpaced the stock HD 3850 in 3DMark06. That extra memory was evident in the 1,600 x 1,200 run of 3DMark06, where Sapphire's card scored more than 200 points better than the stock version. Strangely, though, S.T.A.L.K.E.R. wouldn't run at the highest resolution.

Although the Ultimate HD3850 won't let you plow through current DX10 titles at higher resolutions, it's ideal for HDTV enthusiasts who need a silent card, enjoy light gaming, and don't mind paying a bit of a premium for the privilege.

Asus EAH3850 TOP

The only factory-overclocked card we got our hands on was the EAH3850 TOP. Asus stuck with the stock fansink and basic hardware as the reference model. On the surface, Asus' card has a Company of Heroes: Opposing Fronts shroud decal, but things get really interesting underneath the fansink. Asus bumped the core and memory frequencies to a remarkable 730MHz and 950MHz, respectively.

As the tests show, the EAH3850's higher clocks do a lot more for the card than the Ultimate HD3850's larger frame buffer. The Asus card managed to achieve a 3DMark06 score that was less than 100

selected one of the three cards not connected to our monitor as the slave card. Most of the benchmarks ran flawlessly, except Crysis, which showed some graphical glitches. S.T.A.L.K.E.R. simply refused to run at all. When we ran the test suite with a dual-HD 3850 configuration, we got nearly identical scores, leading us to infer that the third and fourth cards were idle through our quad-card testing. As soon as the CrossFire X drivers become available, you can bet that *CPU* will be there, testing suite in hand. ▲

		Radeon HD 3870 CrossFire	**Radeon HD 3850 Dual CrossFire**	**Radeon HD 3850 Quad CrossFire**
Memory		512MB GDDR4	256MB GDDR3	256MB GDDR3
Core Clock		777MHz	670MHz	670MHz
Memory Clock		1,126MHz	830MHz	830MHz
3DMark06	1,280 x 1,024	13847	13217	13259
3DMark06 HDR/SM3.0		6881	6447	6344
Company of Heroes (4XAA)		47.6	39.3	30.1
S.T.A.L.K.E.R.		96.62	78.11	N/A
Crysis		15.29*	12.53*	11.09*
World in Conflict (4XAA/4XAF)		19	11	7
3DMark06	1,600 x 1,200	13329	12949	12813
3DMark06 HDR/SM3.0		6315	5901	5840
Company of Heroes (4XAA)		39.6	32.7	26.1
S.T.A.L.K.E.R.		82.58	54.15	N/A
Crysis		11.53*	9.37*	3.99*
World in Conflict (4XAA/4XAF)		15	11	8
3DMark06	2,560 x 1,600	11207	9926	9617
3DMark06 HDR/SM3.0		4598	3816	3649
Company of Heroes (4XAA)		20.1	21.1	4.2
S.T.A.L.K.E.R.		34.93	0.75	N/A
Crysis		3.08*	N/A	0.85*
World in Conflict (4XAA/4XAF)		8	N/A**	2

**graphical glitches*

***not enough memory available error*

Scores in red were run with a driver that does not support CrossFire X

Stock specs: GPU: Radeon HD 3870; Core clock: 777MHz; 512MB DDR4 (1,126MHz); 320 stream processor

Stock specs: GPU: Radeon HD 3850; Core clock: 670MHz; 256MB DDR3 (830MHz); 320 stream processors

Catalyst Control Center version 7.11

Specs: GPU: Radeon HD 3850; Core clock: 730MHz; Memory: 256MB GDDR3 (950MHz); 320 stream processing

EAH3850 TOP
$199
Asus
www.asus.com
●●●●◖

points shy of the stock HD 3870. Again, though, the card stumbles at higher resolutions, especially in Crysis and World in Conflict. Like the Ultimate HD3850, S.T.A.L.K.E.R. failed to complete the benchmark at the highest resolution.

The EAH3850 offers performance almost on par with the HD 3870, but at $20 less. The inclusion of Company of Heroes: Opposing Fronts should seal the deal for gamers who haven't picked up that gem of an RTS. ▲

by Andrew Leibman

Radeon HD 3800s By The Numbers

We benchmarked the stock and overclocked ATI Radeon HD 3870 and 3850s using Windows Vista Ultimate 32-bit installed on a 150GB 10,000rpm WD Raptor. For our motherboard, we used the 790FX-based Asus M3A32-MVP Deluxe. We also used a 2.6GHz AMD Phenom 9900 with the Asus Silent Knight CPU cooler, 2GB of Corsair Dominator 1,066MHz DDR2 memory, and PC Power and Cooling's Silencer 750 PSU. The 8800 GT was tested on a system that consisted of the Asus P35-based P5B Deluxe and a 2.93GHz Intel Core 2 Extreme X6800. We used the ATI Catalyst Control Center version 7.11. ▲

		Radeon HD 3870	Radeon HD 3850	Sapphire Ultimate HD3850 512M	Asus EAH-3850 TOP	PNY 8800 GT 512MB PCIe 2.0
Memory		512MB GDDR4	256MB GDDR3	512MB GDDR3	256MB GDDR3	512MB GDDR3
Core Clock		777MHz	670MHz	668MHz	730MHz	600MHz
Memory Clock		1,126MHz	830MHz	830MHz	950MHz	900MHz
3DMark06	1,280 x 1,024	10740	9779	9883	10644	10999
3DMark06 HDR/SM3.0		4745	4179	4217	4606	4957
Company of Heroes (4XAA)		36.8	29.2	32.5	33.5	44.9
S.T.A.L.K.E.R.		56.3	41.14	47.63	40.38	77.87
Crysis		13.89	10.71	12.22	11.73	17.29
World in Conflict (4XAA/4XAF)		18	9	16	9	23
3DMark06	1,600 x 1,200	9455	8392	8600	9259	9648
3DMark06 HDR/SM3.0		3881	3376	3416	3724	4015
Company of Heroes (4XAA)		28.5	21.2	24.8	22.6	26.8
S.T.A.L.K.E.R.		45.62	27.46	35.05	28.96	59.96
Crysis		10.55	7.36	9.25	7.03	12.42
World in Conflict (4XAA/4XAF)		11	9	11	10	18
3DMark06	2,560 x 1,600	6451	5587	5666	6069	6840
3DMark06 HDR/SM3.0		2321	1920	2010	2126	2436
Company of Heroes (4XAA)		13.9	4.8	12.7	4.4	14.7
S.T.A.L.K.E.R.		23.82	12.95	5.29***	15.56***	33.3
Crysis		3.11	2.21	4.2	2.29	3.11
World in Conflict (4XAA/4XAF)		6	3	6	3	3
Price		$219	$179	$299	$199	$269.99
CPUs		●●●●◖	●●●●	●●●	●●●●◖	●●●●

****score achieved before game crashed*

Stock specs: GPU: Radeon HD 3870; Core clock: 777MHz; 512MB DDR4 (1,126MHz); 320 stream processors

Stock specs: GPU: Radeon HD 3850; Core clock: 670MHz; 256MB DDR3 (830MHz); 320 stream processors

Catalyst Control Center version 7.11

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

[FROM THE CORSAIR LAB]

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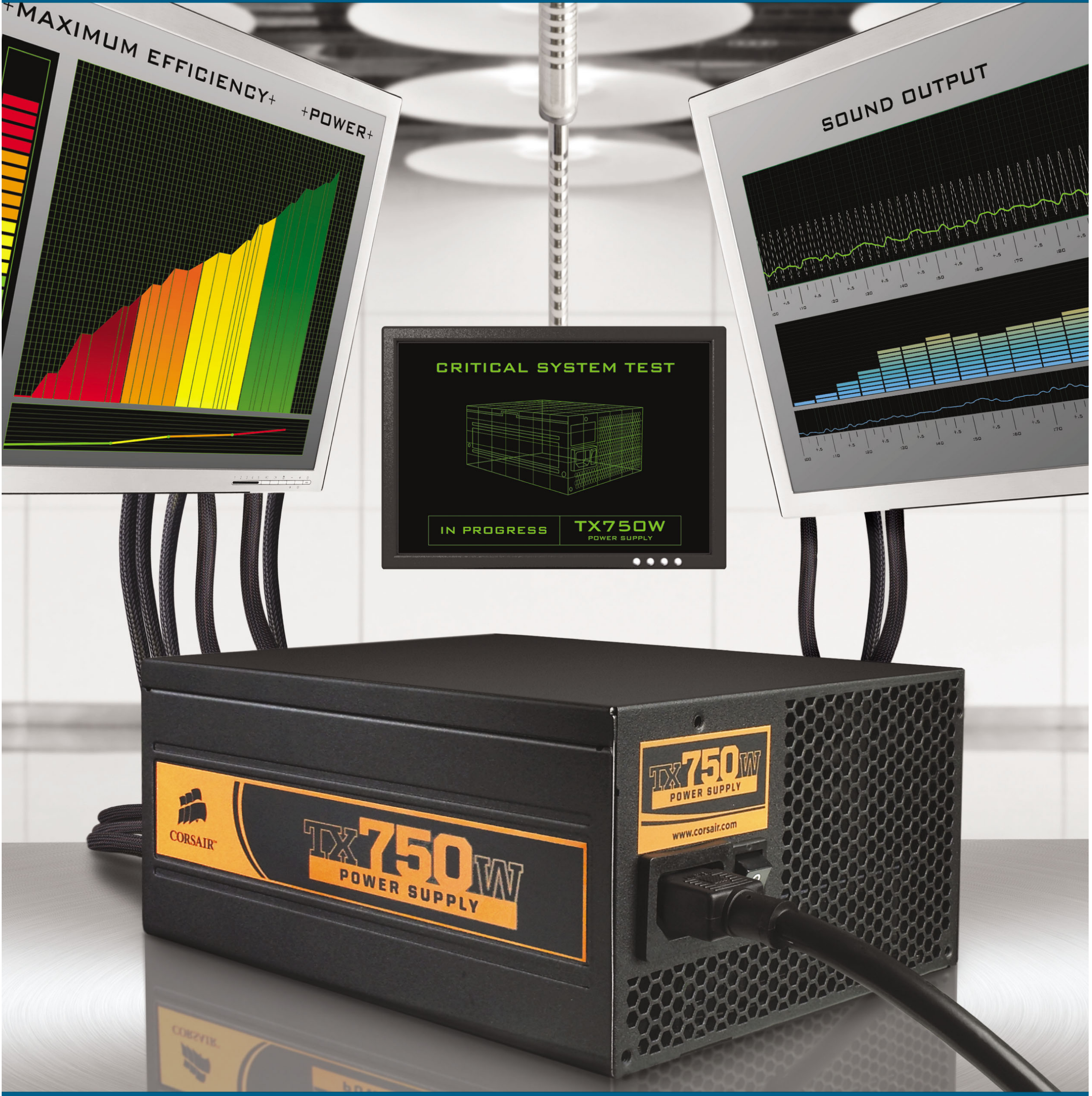

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Video Surveillance Over The Internet

Your Own Eye In The Sky

Network cameras let you harness the power of your home network to set up a video surveillance system that you can view from a remote location, and many manufacturers now offer single- and multiple-camera systems to let you effectively monitor your home. In this roundup, we put five IP-based network cameras to the test, and each one features the ability to view snapshots or live video from a remote PC.

Typically, network cameras offer a number of features not available on Web cams, such as an integrated Web server to let you send images or video via FTP or email without the need to connect to a PC. And many network cameras feature internal motorized controls to let you pan, tilt, and zoom the camera from a Web client on a remote computer or mobile phone. Additionally, most Internet cameras come with software to configure and use the camera, such as to set up a video archive, to configure video recordings based on motion detection, and to set a patrol mode for the camera.

All the models in our roundup can send email alerts based on a motion alarm trigger, so you can immediately be notified of suspicious movement or simply know if the dog walker came to walk the dog. Some models also feature audio capabilities for both audio capture and transmission, which allows you to play prerecorded audio or even use the camera as an intercom during an alarm event. In our tests, we considered the quality of the camera's features as well as ease of use.

And although image quality is subjective, we noted the quality of the video, because if you can't identify subjects from the video, the camera has limited potential for video surveillance.

Linksys WVC200
$299
Linksys
www.linksys.com
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Linksys WVC200

The Linksys WVC200 is a wireless network camera with remote pan, tilt, and zoom functionality—rare features on a model with a $299 price tag. Additionally, the WVC-200 lets you set up to nine preset patrol points, and you can use the zoom, pan, and tilt features to automatically monitor different areas of the room. It offers a 67-degree pan and 34-degree tilt, and in our tests, the 67-degree pan let us view most of a room when we placed the camera in a corner or to one side of the room.

The Linksys software comes with a detailed wizard, but setup requires you to manually enter a lot of network settings, which makes for a lengthy configuration process. In addition, the Web client was not as intuitive as the other cameras in the roundup. However, once you find what you're looking for, the settings are fairly easy to change. For instance, to set a preset patrol point, you only need to adjust the camera to the appropriate focal point and press Set Preset Position. For remote viewing, you can configure the WVC200 to take snapshots and upload the images to an FTP site, and Linksys also includes a 90-day trial of Sololink, a service that lets you view real-time video from a Web address, but you can also use free DDNS (dynamic DNS) services.

To record audio, the WVC200 features an integrated microphone, which did a more-than-adequate job, and you can also attach an external microphone. The WVC200 can capture video at a resolution of 640 x 480 and operate at up to 30fps. If you feel the camera uses too much bandwidth, you can choose a lower resolution or fps setting. The picture quality was good in daylight, but low-light scenes introduced a lot of green and purple color into the video. Therefore, if you plan to monitor a room without much natural light, the WVC200 may not provide enough image detail for the job. However, if the room offers plenty of light, the WVC200 offers the best features in the lower-to-middle price range.

WiLife Indoor Camera Starter Kit

WiLife offers several indoor and outdoor surveillance packages, and all the cameras use HomePlug technology (transfers data over the AC wiring of your home) to connect to your PC—making the cameras extremely simple to set up. For instance, with the Indoor Camera Starter Kit, we only needed

WiLife Indoor Camera Starter Kit
$299.99
WiLife
www.wilife.com
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

to plug the camera into a wall power adapter via Ethernet cable, plug the receiver into a wall and connect it our computer via USB cable, and install the WiLife Command Center. The WiLife Command Center can handle up to six WiLife cameras, and you can add other WiLife cameras by connecting the camera to the wall outlet. We should note that Logitech purchased WiLife in November 2007, and in April 2008, Logitech plans to rebrand the WiLife packaging, but the device and included software will remain the same.

One of the primary advantages of HomePlug technology is that you don't need a broadband router to connect the camera, so the WiLife cameras don't use up your network bandwidth and you avoid wireless signal interference. For mounting, the camera comes with a suction cup, a desktop stand, and a wall or ceiling mount bracket. Choosing the right location for the camera is important, because the camera doesn't offer built-in pan, tilt, or zoom controls. The WiLife Command Center lets you set how much disk space to set aside for video recordings, and WiLife automatically compresses the video into WMV files. To view video remotely, you can create an online account at online.wilife.com and view live video from the camera for free.

The video quality from the indoor camera offers both good color depth and image detail, but you can only record video at up to 15fps, so video may seem jerky if subjects move quickly. We like that the WiLife Command Center lets you configure up to 16 motion-detection zones, and you can even set a minimum duration of motion to avoid alarm triggers based on changes in light. If you're looking for a system that's easy to set up and use, it's tough to beat the WiLife Indoor Camera Starter Kit.

Trendnet TV-IP212W

The Trendnet TV-IP212W features an all-white design and is a little less than 4 inches tall, which is handy for surveillance because you won't immediately recognize the device as a security camera. And with 802.11b/g and Ethernet connectivity, as well as an integrated Web server, Trendnet packs a lot of features into the tiny camera. You have to manually adjust the camera, but Trendnet includes a camera stand with an adjustable mount so that you can place it on a desk or mount it on a wall.

The TV-IP212W comes with software to help you configure the IP address of the camera, and once you set up the IP, you just log in to the IP address from a Web browser to configure the camera. The Web-based client offers convenient buttons for the configurations you'll want to adjust, including Network, Video/Audio, Motion Detect, and Event Configuration. The Motion Detect option was particularly helpful, because you can pick and resize two motion-sensitive windows, so the software only triggers alarms based on movement in a specific area. Additionally, you can set a motion sensitivity threshold to avoid alarms based on shifting light or a flashing LED.

The Web client lets you send live video over free DDNS services as well as lets you configure the integrated Web server to send snapshots or recorded video via email or FTP. Additionally, the TV-IP212W includes a USB port to let you store files on a USB flash drive, but you can also send recorded files to a host PC or network server. The TV-IP212W delivers good image quality and color depth, and with a lens that can operate at 0.5 lux at F2.0, the TV-IP212W delivers enough detail to identify people and objects in dimly lit rooms. On the down side, you can't remotely pan, tilt, zoom, or adjust the focus of the TV-IP212W, so you'll have to position and focus the camera to capture a wide enough view of the room you want to monitor.

Trendnet TV-IP212W
$310
Trendnet
www.trendnet.com
●●●

Zonet ZVC7630W

Zonet touts the ZVC7630W as a night vision security camera, and this wireless network camera delivers excellent video in both bright light and low-light conditions (0.5 lux capability at F2.0). We were particularly impressed by the crisp detail the camera was able to capture. The ZVC7630W works over 802.11b/g networks as well as wired connections, and it features a built-in Web server that can send video for real-time viewing over free DDNS services.

The Web configuration tools allow you to set up 128-bit WEP or WPA-PSK encryption to keep others from easily viewing video from the camera's Web server. And the included Zonet software lets you monitor and record video from up to 16 different cameras. Installation was simple and took less than 20 minutes. You can record video and audio to

Zonet ZVC7630W
$320
Zonet
www.zonetusa.com
●●●

your hard drive, to FTP, to an email account, or to a USB flash drive (which connects to a USB port on the network camera). The auto-iris was quick to respond to changing light conditions, which is good because it's a long trial and error process to change the brightness, contrast, and saturation settings through the Web client. The ZVC7630 features a built-in microphone that accurately captured highs and some lows, but you'll need to connect speakers to produce sound based on motion detection alerts.

The ZVC7630W can capture video at a resolution of up to 640 x 480 at 30fps, and with infrared LEDs, it's possible to see the video in total darkness. If you're looking for an affordable camera for low-light or night video, the ZVC7630W is ideal.

D-Link DCS-6620

D-Link has been manufacturing network cameras for a few years, and the DCS-6620 is one of its more advanced models. It offers a 10x optical zoom, a 270-degree pan, and a 90-degree tilt, so the camera monitors a wall-to-wall area from one side of the room. Additionally, the lens can operate at 0.5 lux at F2.0 to let you record in low-light conditions. And as you may expect from the $850 price tag, the DCS-6620 delivered the best video quality out of the cameras in our roundup.

D-Link includes excellent installation software, and it took us around two minutes to get this wired model up and running. The only downfall is that the Web client limits you to a resolution of 352 x 240 when you record at 30fps. You can capture video at 704 x 480 at 10fps, but 10fps isn't ideal for surveillance video. However, because the camera provides automatic iris and focus controls, you can still easily identify subjects in 352 x 240 resolution video. The D-Link software lets you manage up to 16 cameras at once, and up to 10 users can log in to view video over several popular DDNS services.

Another plus for the DCS-6620 is that the camera makes hardly any noise while panning, tilting, or zooming, so an intruder won't immediately notice the camera in the room. And D-Link built a study base on the camera to keep the Ethernet, power, and audio cables from moving the camera out of position.

D-Link DCS-6620
$849.99
D-Link
www.dlink.com
●●●●

The two-way audio feature is easy to use, but you'll need to attach a speaker to let the camera generate sound. The $849.99 price tag may scare off some users, but when you consider the ease of use, integrated features, and superb image quality, the DCS-6620 is certainly worth the cost. ▲

by Nathan Lake

Network Camera Hightlights

There are hundreds of specifications you can compare for network cameras, and this chart compares just a few of the features available on most of the cameras in our roundup.

	Linksys WVC200	WiLife Indoor Camera Starter Kit	Trendnet TV-IP212W	Zonet ZVC7630W	D-Link DCS-6620
MSRP	$299	$299.99	$310	$320	$849.99
Connection method	802.11b/g or wired	HomePlug technology	802.11b/g or wired	802.11b/g or wired	Wired
Encryption	64-bit WEP, WPA-TKIP, WPA-PSK	56-bit DES encyption	64/128-bit WEP, WPA-PSK, or WPA2-PSK	64/128-bit WEP, WPA-TKIP, WPA2	N/A
Motion detection recording	Yes	Yes	Yes	Yes	Yes
Lens	2 lux at F2.0	2 lux at F2.0	0.5 lux at F2.0	0.5 lux at F2.0	0.5 lux at F2.0
Focus	Manual	Manual	Manual	Manual	Automatic
Patrol mode predefined positions	Yes, up to nine	No	No	No preset positions	Yes, up to six
Remote pan, tilt, and zoom	Yes, 67-degree pan and 34-degree tilt	No	No	No	Yes, 270-degree pan, 90-degree tilt, and 10x optical zoom
Audio support	One-way	No audio	Two-way	Two-way	one way
Frames per second	Up to 30fps	15, 10, or 5fps	30fps	30fps	10 or 30fps
Max resolution	640 x 480	640 x 480	640 x 480	640 x 480	704 x 480
CPUs	●●◖	●●●◖	●●●	●●●	●●●●

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SSDs Start To Sizzle

Mtron & Memoright Take On A Raptor RAID

SSDs are snowballing in importance, so it's interesting to see what a new manufacturer brings to the party. Distributor DV Nation (www.dvnation.com) was kind enough to send us a 32GB drive from Chinese firm Memoright, as well as a handful of new units from Mtron (special thanks once again go to Western Digital for the Raptor hard drives for comparison purposes).

Benchmark results speak louder than words, so here's the takeaway: Any of these SSDs will match or beat a (much cheaper and more spacious) Raptor, although only the Memoright beats the hard drive in sequential write performance. RAID 0 may not double some aspects of SSD performance as it nearly does for hard drives, but then, RAID controller support is key. An SSD's internal controller must also be able to work well with the hard drive controllers in its target market, too. There's likely room for improvement in both controller driver support and SSD firmware.

The Memoright unit uses a custom controller with its Samsung NAND chips, and the result is really fast write speed. The PCMark Vantage subtests will give you a good indication of this SSD's strengths (i.e., OS and app loading, plus A/V file editing and processing). Memoright claims more than double the write cycle life of an Mtron, namely 100GB written daily for more than 200 years vs. 50GB per day for 140 years. Yeah, we'll let you know when we finish *that* particular test.

Something we may not have mentioned before is that the read/write graphs for single SSDs look like flat horizons as compared with a hard drive's gentle curve into slower performance toward its upper capacity limit. Hard drives fill their disks inward from the outer tracks, where their sequential speeds are highest. Among other things, this means that hard drives are able to retrieve the first files written to a fresh partition, such as OS files, faster than they can read data files added later. SSDs read and write at the same great speed no matter which of the drive's silicon chips physically store a chunk of data.

All of the SSDs we've handled thus far have used SLC (single-level cell) NAND memory, which offers outstanding speeds at high prices. New MLC (multilevel cell) NAND units from the likes of STEC and Toshiba seek to make SSDs more

MSP-SATA7035-064 (SATA 3.5" 64GB)
$1,999
Mtron
www.mtron.net
●●●●

MSP-SATA7035-032 (SATA 3.5" 32GB)
$1,199
●●●●◖

MSD PATA-3025 (PATA 2.5" 32GB)
$1,299
●●●◖

Specs (Mtron): 7-bit ECC; 1 million-hour MTBF; dynamic/static wear-leveling algorithms; bad block management; 10-year data retention; five-year warranty (three years for MSD PATA-3025)

Specs (Memoright): 200G operating (2ms)/800G nonoperating (1ms) shock tolerance; ECC; 16MB cache; >10-year data retention

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affordable and capacious, albeit with slower performance. The trick with MLC is beefing up the controller's error correction capability without unnecessarily harming throughput, STEC says.

Speaking of STEC, stay tuned for a review of the company's SLC-based ZeusIOPS 146GB. Our evaluation unit was optimized for server controllers, not desktop, and our test results showed it. New firmware may be on the way, so we'll give the STEC another spin then.

SSDs are silent. They're typically thinner than desktop hard drives and run cooler than performance units. SSDs offer double or treble the impact resistance of a hard drive, broader temperature tolerance, and lower power consumption. Desktop benefits include slightly faster boot times and multiplayer game hosting I/O. The dark side, of course, is a cost per gigabyte like a bargain with a Sith. ▲

by Marty Sems

ATA MR25.1-S032G (SATA 2.5" 32GB)
$1,099
Memoright
www.memoright.cn
●●●●◖

Benchmark Results

Test system: *Vista Home Premium, Core 2 Duo E6700 2.67GHz, 2GB DDR2 (1,066MHz), Intel D975XBX2KR, Radeon HD 2600 XT*

	Mtron Pro SSD 3.5" 64GB	**Mtron Pro SSD 3.5" 32GB [RAID 0]**	**Mtron Pro SSD 2.5" 32GB**	**Memoright SSD 2.5" 32GB**	**Raptor 150GB WD1500ADFD [RAID 0]**
PCMark Vantage 1.0.0 (Nov 07 patch)					
HDD Score (points)	6970	7412 [8032]	6586	8500	3437 [4264]
Defender (MBps)	57.6	61.4 [69.9]	50.9	61.7	20.1 [22]
Gaming (MBps)	86.7	92.8 [108.7]	70.2	69.3	14.5 [16.5]
Photo Gallery import (MBps)	95.8	100.7 [138.1]	75.6	76	32.7 [35.6]
Vista startup (MBps)	43.6	43.5 [47.1]	38.2	47.3	10.1 [17.1]
Movie Maker edit (MBps)	19	22.3 [21.1]	21.8	39	27.9 [30.9]
Win Media Ctr (MBps)	28	31.4 [33.7]	30.5	53	42.6 [56.1]
WMP music add (MBps)	8.7	9.1 [8.5]	9.1	14.2	9 [9.8]
Application Loading (MBps)	12.8	12.7 [13]	12.5	13.4	4.2 [6.4]
HD Tach RW 3.0.4.0, Long Bench					
Read rates, average/maximum (MBps) [129.5/160]	100.7/101	105.7/108 [128.7/160]	77.7/79	81.1/83	75.5/88
Write rates, average/maximum (MBps)	48.8/50	53.9/55 [42.1/45]	50.8/52	98.9/103.5	64.7/74 [67.9/92]
Random access time** (ms)	0.1	0.1 [0.1]	0.1	0.1	8.3 [8.4]
Burst read rate (MBps)	104.4	109.4 [171.8]	82.1	92.2	127.5 [178.5]
CPU Utilization** (%, +/- 2%)	4	2 [5]	4	4	3 [7]
Iometer 2006.07.27					
File Server (IOps)	603	552 [952]	556	525	185 [269]
File Server (MBps)	6.5	6 [10.3]	6	5.7	2 [2.9]
File Server avg/max response** (ms)	27/141	29/148 [17/135]	29/170	30/89	86/1205 [59/898]
Web Server (IOps)	5097	5402 [9112]	3893	3682	202 [315]
Web Server (MBps)	77.7	83 [140]	59.4	55.6	3.1 [4.7]
Web Server avg/max response** (ms) [203/1139]	13/52	12/47 [7/33]	4/31	17/67	317/1570
Interface	SATA 150MBps	SATA 150MBps	IDE 133MBps	SATA	SATA 150MBps
Price	$1,999*	$1,199 [$2,398]*	$1,299*	$1,099*	$269.99 [$539.98]
CPUs	●●●●	●●●●◖	●●●●	●●●●◖	

* Prices from DV Nation
** Lower is better

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Dell UltraSharp 3008WFP

Dell's UltraSharp displays have been the market leaders for years, second only to Samsung as of recent. In addition, Dell's UltraSharp 3000 series have been high-end desktop and workstation favorites for some time. About a year ago, Dell introduced its UltraSharp 3007WFP-HC, a 92% color-gamut-capable 30-inch LCD that we covered for you here in the pages of *CPU* in early '07. (See page 30 in the February 2007 issue of *CPU*.) We gave the 3007WFP-HC high marks, but it wasn't without a few shortcomings. It was completely devoid of image adjustment controls and came equipped with a single DVI-D input.

Dell listened to its customers when it was architecting the third coming of its 3000 series LCD. This time, Dell's big screen, the UltraSharp 3008WFP, has not only a slew of on-screen control features, but also a plethora of I/O interface options have been added. In addition, the 3008WFP incorporates a new bezel and stand design that's a significant improvement to the display's sexiness coefficient.

Dell's 3008WFP is rated to reproduce up to 117% of the NTSC color gamut (compared to the 3007WFP-HC's previously mentioned 92%). In short, the 3008WFP has the capability to output color resolution and fidelity beyond the NTSC spec. Dell claims the UltraSharp 3008WFP supports Adobe 98 color standards, which is an advantage in professional desktop publishing applications.

Dell was pretty secretive about which image scaler chip it chose for the UltraSharp 3008WFP, but it's safe to say that any serious image scaling engine is a welcome upgrade. Although we didn't have the heart to pull the new panel apart, we'd speculate it has either the Silicon Optix Realta chip or perhaps something from AMD's Xilleon line. Regardless, the 3008WFP's ability to display crisp images at lower resolutions is significantly improved over previous generations, which is nice in situations when 2,560 x 1,600 isn't an option.

In addition to its two DVI-D ports, component, composite, S-Video, and HDMI inputs, the 3008WFP is one of the first LCD displays on the market to offer a DisplayPort interface. We've covered DisplayPort technology in detail previously (see pages 50 to 52 in the April 2007 issue of *CPU*), but as a refresher, think of DisplayPort as a sort of HDMI for PCs. DisplayPort is a new digital video interface that will overtake DVI-D connections in future generation computers.

DisplayPort also carries an HD audio signal and supports 16-bit color per channel with an interface that supports up to 10.8Gbps data rates and WQXGA resolutions of 2,560 x 1,600 over significantly longer cable lengths (up to 15 meters). Additionally, you can daisy chain multiple screens together off a single display port connection. Talk about workspace!

With UltraSharp 3008WFP's 3,000:1 contrast ratio, 8ms response time, and 370cd/m^2 luminance, the panel also sports a significantly improved LCD at its core. Comparatively, the 3007WFP-HC only offered a 1,000:1 contrast ratio and 300 cd/m^2 luminance. In testing, the panel showcased the benefits of this extra performance, offering rich, saturated images on the desktop with excellent black reproduction and super clean whites. Although we can't say the panel's wider color gamut really stood out to us over the 3007WFP-HC, its color accuracy and uniformity across the large screen was particularly impressive.

It took a lot of button-pushing to dial in the UltraSharp 3008WFP, but we also saw significant benefits from the panel's onboard image scaler processor. We dropped the resolution down to 1,920 x 1,200, and the 3008WFP still produced a near pixel-perfect picture once we dialed up sharpness and enabled the dynamic contrast feature. The 3008WFP's advancements only distanced it more from other 30-inch displays under gaming conditions, where 1,920 and 1,280 x 800 widescreen formats stretched to fill the screen looked meticulously sharp, though not quite as perfect as gaming at its native resolution. And with its 8ms response time, we also didn't experience any judder or ghosting during game testing, as well.

All told, the new Dell 3008WFP is shaping up to be a major improvement over its predecessor, the 3007WFP-HC. You'll pay a premium for this monitor but will definitely get what you pay for. ▲

by Dave Altavilla

Specs: 2,560 x 1,600 (WQXGA); 117% NTSC color gamut; 8ms response time; 370cd/m^2 luminance; Ports: Analog, 2 DVI-D (dual-link, HDCP), S-Video, composite, component, HDMI, DisplayPort, 4 USB, Kensington security port

UltraSharp 3008WFP
Dell
www.dell.com
est. MSRP: $2,100
●●●●

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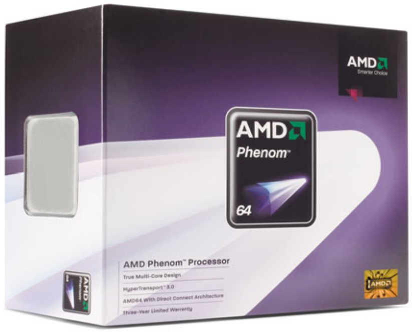
AMD Phenom 9900

With the Phenom processor series, AMD has a quad-core challenger to Intel's well-established Core 2 Quad line. We tested an engineering sample of the Phenom 9900, which is the most powerful processor in the series at 2.6GHz. The Phenom series is part of AMD's Spider platform, which also includes motherboards based on the new 7-Series chipset and AMD ATI Radeon HD 3800 series graphics cards.

The fledgling Phenom series also includes the Phenom 9500, 9600, and 9700 (at 2.2GHz, 2.3GHz, and 2.4GHz, respectively). All of these processors support the AMD 7-Series' Socket AM2+ and all have a new memory clock feature: The memory clock (which is integrated with the processor) is separate from the CPU frequency.



Thanks to this dedicated clock, the memory controller runs the computer's DDR2 memory at the specified frequency, instead of the slightly skewed frequencies that AMD Athlon X2s cause.

But the 9900 differs from the other Phenoms in more ways than clock speed. At 140W max TDP, it runs hotter than the other processors. (The 9700 has a max TDP of 125W, and the other two ring in at 95W.) The Phenom 9900 also has a 2GHz memory controller frequency, which is 200MHz faster than its siblings' controllers.

The Phenom 9900 isn't a competitor for Intel's highest-clocked quad-core CPUs, but the AMD chip provides reasonable performance. It posted a solid 7282 in PCMark05, which is much higher than we've seen in recent AMD Athlon X2 processors.

At AMD's behest, we ran a BIOS update for the Asus M3A32-MVP Deluxe in our test system before we started the benchmarking process. The BIOS update disables erratum #298. The TLB (translation lookaside buffer) L3 protocol erratum is a hardware issue that can, in rare instances, cause the system to freeze. Processor errata aren't new, and this glitch isn't likely to affect most users. But AMD opted for caution, even though the update causes a slight performance hit.

Our engineering sample didn't take well to overclocking. In fact, our test system became unstable when the CPU's clock speed moved beyond 2.67GHz. Not surprisingly, the Phenom 9900's performance wasn't much better at overclocked settings than in default mode.

AMD tells us that the Phenom 9900 will be available for less than $350 by the time you read this, which makes this a reasonably inexpensive processor. Overall, the Phenom 9900 looks to be a better chip than similarly clocked AMD Athlon 64 X2 processors. That said, we wouldn't be surprised if many users opt to hold off on upgrading until the Phenom series matures. ▲

by Joshua Gulick

Benchmark Numbers

	2.6GHz with TLB erratum BIOS fix enabled	**2.6GHz with TLB erratum BIOS fix disabled**	**2.67GHz with TLB erratum BIOS fix disabled**
Cinebench 10*			
Single-threaded (min:sec)	6:16	6:36	6:09
Single-threaded (score)	2184	2232	2394
Multithreaded (min:sec)	1:45	1:45	1:43
Multithreaded (score)	8463	8463	8511
PCMark05 1.2			
Overall	7282	7299	7315
CPU	7672	7684	7852
Memory	4690	4658	4668
Graphics	9180	9208	9317
HDD	6455	6671	6587
SiSoftware SANDRA Lite XII SP1			
Processor Arithmetic			
Dhrystone ALU (MIPS)	34,902	34,937	27,040
Whetstone iSSE3 (MFLOPS)	33,708	29,794	34,450
Processor Multi-Media			
Integer (iit/s)	99,318	78,179	100,034
Floating Point x4 iSSE2 (fit/s)	126,388	130,307	72,067
Memory Bandwidth			
Integer Buffered iSSE2 (MBps)	9,970	9,970	9,970
Floating-Point Buffered iSSE2 (MBps)	9,980	9,970	9,960
Other Benchmarks			
Dr. DivX 2*	4:50	4:40	4:29
Dr. DivX 2.0.1*	6:11	6:02	5:55
POV-Ray 3.7 Beta**	1773	1777	1814
WinRAR 3.71*	2:31	2:26	2:33

* minutes:seconds ** pixels per second

Specs: Socket AM2+; Clock speed: 2.6GHz; HyperTransport Link: 4GHz (full duplex); 65nm process; Cache: 2MB shared L3, 2MB L2 (512KB per core), 512KB L1 (128KB per core); Voltage: 1.1V/1.25V (min/max); 140W max TDP

Phenom 9900
Retail price unavailable at press time
AMD
www.amd.com
●●●

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AMD Phenom 9600 Black Edition

AMD's line of native quad-core Phenom processors left many enthusiasts feeling a bit flat upon their arrival. At like clock speeds, Phenom processors put a hurting on the aging Athlon 64 X2 in most applications, especially those that were multithreaded. But in comparison to Intel's additions to its Core 2 lineup, the Phenom fell short (not to mention the Phenom's TLB [translation lookaside buffer] bug that hinders performance when patched). The competition and perceived shortcomings of Phenom has forced AMD to be creative with the pricing and positioning of its current flagship processors.

The Phenom 9600 Black Edition is the fruit of AMD's current creativity. The Phenom 9600 BE is essentially identical to the standard 9600 in terms of features, performance, and even price. But the Black Edition has an unlocked multiplier for more flexible overclocking.

By altering the HT clock and voltage alone, I've had trouble overclocking standard Phenom 9600 processors much past 2.6GHz with the current crop of socket AM2+ motherboards. The 9600 BE, however, using a combination of voltage, multiplier, HT clock manipulation, and nothing more than a stock AMD cooler, had no trouble breaking 2.8GHz. (It would even boot into Windows Vista at 3GHz, but the system was far from stable.)

Phenom definitely needs some time to mature for AMD to work out all of the kinks, but for unwavering AMD fans looking to upgrade to a quad-core CPU, the Phenom 9600 BE is currently the chip to own. ▲

by Marco Chiappetta

Specs: Socket AM2+; Clock speed: 2.3GHz; HyperTransport Link: 3.6GHz; Cache: 2MB L3 (shared), 2MB L2 (512K per core), 512K L1 (128K per core); 65nm process

PCMark Vantage	
PCMark Score	4181
Memories	3772
TV & Movies	3613
Gaming	4654
Music	3514
Communications	3105
Productivity	4069
POV-Ray 3.7 (beta 23)	1572
Cinebench 10	
Single-threaded (score)	2043
Single-threaded (timed)*	7:22
Multithreaded (score)	7411
Multithreaded (timed)*	1:59
3DMark06	
CPU Score	3229
Crysis 800 x 600, low quality	83.22

*minutes:seconds

Phenom 9600 Black Edition
$239
AMD
www.amd.com
●●●◖

Asus EN8800GTS TOP

Asus has been known to dabble in factory-overclocking its hardware, and its EN8800GTS TOP is a great example. The GeForce 8800 GTS-based card disregards Nvidia's recommended 650MHz/970MHz GPU core/memory clock speeds in favor of much speedier 740MHz/1,035MHz clocks. With speeds that high, the EN8800GTS TOP easily outperforms most other G92-based GeForce 8800 GTS cards and even surpasses the mighty 8800 GTX and Ultra in some benchmarks.

With the exception of its clock speeds and a couple of decals on its fan barrel and shroud, the Asus EN8800GTS TOP card itself doesn't differ from Nvidia's reference design in any major way. It has the same dual-slot cooler, PCB layout, and video outputs. And don't expect an exceptional software bundle: No games were included with the EN8800GTS TOP.

The EN8800GTS TOP's high clock speeds yielded strong performance. The card put up excellent scores in 3DMark06 and Half-Life: Episode 2. Enemy Territory: Quake Wars also proved to be quite playable, but Crysis brought the card down to sub-30fps levels at the resolutions and quality levels I tested.

With a street price hovering around the $400 mark, the Asus EN8800GTS TOP isn't cheap. It's far more affordable than GeForce GTX and Ultra cards, however, and offers similar performance. ▲

by Marco Chiappetta

EN8800GTS TOP
$389
Asus
www.asus.com
●●●●

Specs: GPU: Nvidia GeForce 8800 GTS (G92); GPU clock: 740MHz; Shader clock: 1,800MHz; Memory: 512MB GDDR3 (1,035MHz)

3DMark06	
Overall	13339
SM2.0	5365
SM3.0/HDR	5779
Half-Life 2: Episode 2 (4XAA/16XAF)	
1,600 x 1,200	106.89
1,920 x 1,200	87.71
Enemy Territory: Quake Wars (4XAA/16XAF)	
1,600 x 1,200	66.3
1,920 x 1,200	57.1
Crysis (No AA, High Quality Mode)	
1,600 x 1,200	28.66
1,920 x 1,200	23.62

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Überclok Reactor

Reactor
$4,118.99 (as tested)
Überclok
www.uberclok.com
● ● ● ◖

Überclok is relatively new to the custom PC scene, and the Chicago-based builder offers preoverclocked gaming systems to provide customers good price-to-performance value.

Currently, Überclok offers two models: the Ion and the pricier Reactor. The Reactor we evaluated is an example of a midrange gaming configuration. You could upgrade to dual GeForce 8800 Ultras, a 3.7GHz Intel Core 2 Duo E6850, and add as much as 8GB of system memory.

To maximize airflow to the overclocked components, Überclok uses an Antec Nine Hundred case, which features a perforated front bezel with two 120mm fans, one 120mm rear fan, and a 200mm fan at the top of the case. Additionally, the Reactor included a Tuniq Tower 120 heatsink with a 120mm fan in the center of the heatsink's fans that's perpendicular to the CPU to blow air directly out to the 200mm top fan. Surprisingly, the Reactor ran fairly quiet with the five fans. Aesthetically, the all-black case isn't going to drop any jaws (currently, Überclok does not offer custom paint jobs), but with a DVD±RW DL, a DVD-ROM, a 6-in-1 card reader, and top-facing FireWire and USB ports, the Reactor gave the impression of a no-nonsense power user PC. The case appeared roomy from the window side panel, and you have room to work inside the case thanks to Überclok's tidy routing of cables.

The Reactor we tested includes both a 150GB Western Digital RaptorX and a 1TB Hitachi Deskstar, so you have plenty of storage. And the Creative X-Fi XtremeGamer audio card and D-Link DWA-556 wireless card are nice inclusions that provide a well-rounded lineup of hardware on the system. As for overall parts selection, Überclok lets you choose from a few options for every component but the motherboard and the case. We particularly liked the choice of a DVD±RW DL, BD-RE, or HD DVD ROM drive. Our Reactor came packed with components, so there wasn't too much room for expandability, but there were two empty hard drive bays.

The graphics power in the system comes from two BFG 8800 GTX OC2 cards, and Überclok updated the Reactor at press time to offer the option of two 8800 Ultras. The Tuniq Tower 120 CPU cooler let Überclok raise the Intel Core 2 Quad from 2.4GHz to 3.2GHz, and the 4:01 (minutes:seconds) and 1:30 Cinebench 10 results show the benefits. We experienced some issues with Crysis at the 2,560 x 1,600 resolution, but a reinstalling of our graphics driver got the Reactor to run the game at the highest settings with AA disabled. (And Überclok was quick to answer our tech support call and was helpful dealing with the problem.)

Overall, the Reactor delivered good scores for a midrange gaming system, particularly the overall 3DMark06 score of 15382 and 64fps in S.T.A.L.K.E.R. Despite the issues with Crysis, the overclocked components seemed stable, and the Reactor offers plenty of ventilation to keep the components cool. Überclok systems come with a 30-day guarantee and a three-year parts and labor warranty, including the overclocked components (of course, provided you don't further overclock them). ▲

by Nathan Lake

Benchmark Numbers

3DMark06	
Overall	15382
SM2.0	5786
HDR/SM3.0	7817
CPU	3993
PCMark05	
Overall	8825
CPU	9694
Memory	6497
Graphics	12147
HDD	6051
WinRAR 3.71*	3:10
Cinebench 10	
Single-threaded (timed)*	4:01
Single-threaded (score)	3606
Multithreaded (timed)*	1:30
Multithreaded (score)	9206
POV-RAY 3.7 Beta**	2185
Crysis (no AA)	2.8
Company of Heroes (4XAA)	13
World in Conflict (4XAA/16AF)	11
S.T.A.L.K.E.R.	64

Games tested at 2,560 x 1,600
*(minutes:seconds)
**pixels per second

Specs: Intel Core 2 Quad Q6600 @ 3.2GHz, XFX 680i SLI (MB-N680-ISH9), 4GB Corsair XMS2 DDR2-800, BFG GeForce 8800 GTX (SLI), 150GB Western Digital RaptorX, 1TB Hitachi Deskstar 7K1000 7,200rpm, Cooler Master Real Power Pro 850W, Creative X-Fi XtremeGamer, D-Link DWA-556, Lite-On LH-20A1L , Lite-On DH-16D2S-04, Windows Vista Ultimate 64-bit.

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ● ● ◖ **2.5 = ABSOLUTELY AVERAGE** | ● ● ● ● ● **5 = ABSOLUTELY PERFECT**

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by Anand Lal Shimpi

A Golden Season Of Gaming?

Last year saw a number of incredible game releases, garnering rave reviews and giving gamers everywhere lots to do over the holidays. Titles like Halo 3, BioShock, Mass Effect, Call of Duty 4, and a new, revolutionary Mario game were all top picks. Then we had more unique titles, such as Guitar Hero III and Rock Band, bringing videogames to brand new audiences (and bringing music to videogame audiences). Unfortunately for the PC industry, there is a very noticeable trend here: While BioShock, Call of Duty 4, and Guitar Hero III are available on the PC, the rest are console exclusives, echoing a trend we've all seen over the past several years: the steady demise of PC gaming.

With the exception of RTS (real-time strategy) games and World of Warcraft, most games have made the transition to consoles quite successfully. And consoles have gotten powerful enough where the gap between what's possible on a PC and what's possible on a console isn't large enough to really justify the move to a PC as a gaming platform for most.

Microsoft surely hasn't done much to help matters for PC gamers. Every time I review a new video card, there's yet another Vista hotfix available through cryptic channels that addresses something that may be a performance issue with DirectX 10 games. While SP1 is sure to integrate many of these hotfixes, you can't argue with the simplicity of gaming on a console—insert a disc, *maybe* press a single button to update your game, and don't even think about needing a product key.

That being said, I believe there are some saving graces for PC gaming; however, they are all things we won't see for quite some time.

Copy protection is a seriously disturbing aspect of PC gaming that needs addressing. A few games like Oblivion have shipped without so much as a product key being required, but these are rare exceptions. Titles like BioShock, on the other hand, actually required product activation, an unbelievable development given that Apple ships an entire OS that doesn't.

Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today, *CBS' "48 Hours," and* Fortune. *His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.*

Keep in mind that the PlayStation 3 has the equivalent of a slow GeForce 7800 GTX inside it, and the Xbox 360's graphics power isn't much better, yet aside from support for higher resolutions and detail settings, I'm not really blown away by much that is done in even the best-looking PC games. For a while there, Gears of War on the Xbox 360 was the best-looking game title I'd seen, but this was largely due to solid execution and not because it was relying exclusively on raw horsepower to make it pretty.

Even an average gaming PC today is much more powerful than either of the high-end consoles on the market; pair up an 8800 GT with any Core 2-based processor and you've got something much faster than an Xbox 360. The problem is getting developers to take advantage of that. While the installed base of PCs is far greater than that of game consoles, the average computer can hardly run a demanding game.

The vast majority of PCs ship with integrated graphics, which more often than not can't run the latest games. Although AMD and Nvidia consistently outshine Intel when it comes to integrated graphics performance, they only do as much as they need to, which isn't much considering the state of Intel's integrated graphics offerings.

By the end of the decade, Intel expects to dramatically improve its integrated graphics performance, which should lead to a better minimum level of gaming performance out of shipping PCs. Look at it this way: If the cheapest PCs shipping today could offer close to the power of a Xbox 360 or PS3, PC gaming might be a bit stronger than we find it today.

The CPU/GPU convergence that will come afterward may make the PC a more attractive gaming platform. PC gaming will likely continue on its current decline, but this is just one of those problems that can be solved by Moore's law—better graphics hardware in shipping systems could definitely change things. ▲

Talk back to Anand at anand@cpumag.com

by Alex “Sharky” Ross

nForce 780i SLI

For over a year now, most gamers (me included) have been using Nvidia’s nForce 680i SLI-based chipsets as a basis for a dual-GPU gaming PC. With Intel’s latest round of 45nm Penryn-based processors, the 680i SLI chipsets need updating. A simple BIOS/driver update, however, won’t “officially” fix the inherent compatibility issues. Hence, Nvidia had to step up with a refresh to properly compete with Intel’s own X38 chipset. In the nForce 700 series of chipsets, we now have that compatibility, as well as a few new interesting features for the higher-end 780i SLI part. The 780i chipset is based upon the same 680i micro-architecture and 90nm TSMC process. There was nothing wrong with previous 680i features such as DualNet, FirstPacket, MediaShield, and EPP, and hence they all make the same appearance. The new candy comes in the form of support for second-generation PCI Express, three-way SLI configurations, and Nvidia’s ESA (Enthusiast System Architecture).

The introduction of Nvidia’s ESA standard (built around the USB Human interface device) is a positive one for us tweakers. Essentially, ESA is a hardware and software interface that grabs data from analog sensors and converts it to digital information to be accessed via software to aid real-time monitoring and provide control over all things thermal/voltage-related. The ability to tweak, adjust, and customize beyond traditional BIOS tweaks is very welcome indeed and something that we’ve all wanted for a long time, so hopefully ESA picks up some momentum in 2008.

The north- and southbridges (or SPP and MCP, as Nvidia dubs them) remain the same as the 680i series, but Nvidia has added a third processor in the nForce 200 chip in order to support the necessary 32 lanes for full PCI-E 2.0 compliance. Using Nvidia’s proprietary interface, there’s a theoretical maximum of 14.4GBps of bandwidth. The 1,333MHz frontside bus speed isn’t new, but it’s very necessary for pushing the envelope. The 780i even allows for 1,600MHz FSB speeds unofficially. For this version, there is no support for DDR3 memory, but Nvidia does plan to add it via a new SPP (think refresh).

Nvidia’s reference design sports three PCI-E x16 slots and two regular PCI slots, as well as a single PCI-E x1 slot. Having the ability to team up to three GPUs sounds exciting, but it’s unlikely that many of us will populate three of those slots with current high-end GPUs. It doesn’t make economic sense, but it’s nice to know that it can be done successfully. Early performance tests haven’t shown any real benefit to running three cards in SLI over two. Although there are signs of promise if you’re using insanely high 2,560 x 1,600 resolutions on a 30-inch display playing the ever-resource-hogging Crysis. Obviously, the better option would be to sit tight for newer G92-based GPUs to show up and populate one to two of those slots. In today’s world, a pair of GeForce 8800 GTs in SLI mode is the popular choice and potent enough for any gaming requirements.

The I/O panel, with its improved layout, gives you a single FireWire and six USB 2.0 ports. The dual GigE jacks make a comeback, as well as the usual digital audio inputs/outputs. In terms of overall layout, there’s plenty of room for Nvidia’s board partners to play with various configurations. The cooling solutions are a little more elaborate to deal with considering the additional nForce 200 chip, but you’ll be pleased to know there’s enough room for aftermarket coolers.

The nForce 780i SLI (the top of the range) wasn’t quite ready for Intel’s 45nm Core 2 release late last year, but by the time you read this, Asus, XFX, MSI, Gigabyte, and Evga all have available solutions so you can start disassembling that 680i SLI system. Even though the performance numbers aren’t very different from the outgoing 680i’s, the new features and better compatibility warrant the upgrade if you’re planning to use any of Intel’s latest processors. Think of this as an evolutionary upgrade. . . . ▲

Email me at sharky@cpumag.com

Disrupting Reuters’ newswire with a cheery Christmas greeting at age six, Alex “Sharky” Ross became an avid computer user/abuser, eventually founding popular hardware testing/review Web site SharkyExtreme.com. Exposing shoddy manufacturing practices and rubbish-spouting marketing weasels while championing innovative products, illuminating new technology, and pioneering real-world testing methods was just a front for playing with the best toys. The site acquired, he left in 2001. A London native and London School of Economics graduate, Alex currently overclocks/tunes Porsche 996 Turbos with www.sharkwerks.com when he’s not tweaking PCs.

PC Modder

Tips & Tutorials

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Mods & Ends

Lian Li PC-V350

Frequent LAN goers have recognized the appeal of custom, SFF systems since their inception, and the recent influx of high-end microATX motherboards based on Intel's, Nvidia's, and AMD's current chipsets should maintain that appeal. If you're looking to build yourself an SFF system but want a stylish enclosure that's sure to grab some attention, check out Lian Li's slick PC-V350 ($120). The PC-V350 is a cube-shaped, aluminum chassis designed for microATX motherboards, but its shape can accommodate any standard ATX PSU. The Lian Li PC-V350 features a removable motherboard tray, side-mounted A/V and USB ports, three fans (two 120mm and one 80mm), and vibration dampeners. The chassis' drive cage holds both 3.5-inch and 5.25-inch drives and mounts to either side of the case. The Lian Li PC-V350 is available in a silver or black finish.

The Lian Li PC-V350: Resistance is futile.

Addonics Zebra

We've expressed our disgust for the ongoing HD optical format war numerous times. Thankfully, products are arriving that make siding with one format unnecessary. Take the eSATA Addonics Zebra ZBH63DES ($409) or the USB-equipped ZBH63DEU ($429), for example. The Addonics Zebra is an external Blu-ray Disc and HD DVD player that also includes DVD±R/RW functionality. Simply plug the Zebra into an available port and you'll be able to play BDs and HD DVDs with the same drive. It's still a relatively expensive proposition, but if you don't want to settle on a single HD format just yet, a drive like the Addonics Zebra makes things easy.

What format war? Addonics' Zebra reads both Blu-ray Discs and HD DVDs .

Thermalright HR-03

Today's high-end video cards have one thing in common: Their cooling fans can be loud when spinning at their maximum speeds. If you'd like to put an end to that noise without sacrificing any cooling performance, look to the Thermalright HR-03 ($55). The HR-03 is a massive, passive cooling solution that is compatible with a wide range of Nvidia- and ATI-based video cards, including the Radeon HD 2900 XT (model HR-03/R600) and relatively new GeForce 8800 GT and Radeon 38xx series (model HR-03 GT). Thermalright outfitted the unit with six heatpipes soldered directly to the HR-03 GT's large heatsink fins. It also features a polished base for maximum heat transfer from the GPU and also includes BGA RAM heatsinks to help cool the video card's onboard RAM. The included mounting hardware lets the HR-03 GT sit atop the video card or wrap around it, and, according to Thermalright, the HR-03 GT outperforms stock coolers.

Thermalright's enormous HR-03 GT passively cools even the hottest-running graphics cards.

Fashionably Fresh Firmware

Plextor PX-810SA DVD±R/RW (v1.01)

A recent update for the Plextor PX-810SA DVD±R/RW improves the drive's compatibility with various types of writeable DVD media.

www.plextor.com

Belkin F1PP000GN-SK (v1.1.0.22)

This firmware resolves echo issues and improves the phone's responsiveness, stability, and headset support.

www.belkin.com

Pioneer DVR-212D (v1.24)

Pioneer has updated its internal DVR-212D recordable drive's firmware for increased performance and compatibility with CD-R media.

www.pioneer.com

by Marco Chiapetta

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PC POWER PERFORMANCE

Hush Those Fans

Easy (& Free!) 5V & 7V Fan Mods

Every moving part in a PC generates noise. The motors in optical drives and hard drives and the cooling fans that keep your hardware cool are the most notorious culprits in your case. All of these moving parts can result in an annoyingly loud PC. But don't fear; there are many things you can do to quiet a system down without spending a mountain of cash.

Most of today's power supplies, graphics cards, and CPU coolers have fans that will throttle their speed (and thus, noise produced) based on temperatures or load, so even the highest-end products aren't too disruptive—we'll ignore those for now. You can install your hard drives in vibration-dampening enclosures that minimize their noise levels. And you can silence your case fans in a number of ways, too. As for optical drives, well, don't leave a disc in the drive when it's not in use, and it'll be quiet.

This month, we're going to focus on case fans because they tend to be one of the noisiest parts in a typical PC; yet, they're one of the easiest to mod. We have a method in store that will quiet them down, and, perhaps best of all, you won't have to spend a penny to execute it.

How Does It Work?

The majority of fans included with cases or sold individually are designed to operate at 12V. The PSU feeds 12 volts to the fan's motor, which causes the fan's blades to rotate and circulate air. Increasing or decreasing that 12V feed, however, makes the fan's motor spin at different speeds. Increase the voltage, and the fan will spin faster, move more air, and generate more noise. Conversely, lowering the voltage will do the opposite. That's the basic premise behind this mod.

There are limits to how high or low to set a fan's supplied voltage. Feed too much voltage into the fan and its motor will burn out; don't supply enough voltage and the fan won't spin up at all. Generally speaking, feeding 13 to 15 volts to a fan is a safe bet and won't cause any damage. Conversely, 4 to 6 volts is usually enough to get the fan spinning.

Because our ultimate goal with this mod is to quiet noisy case fans, we're going to focus on ways to lower the input voltage without purchasing any additional parts.

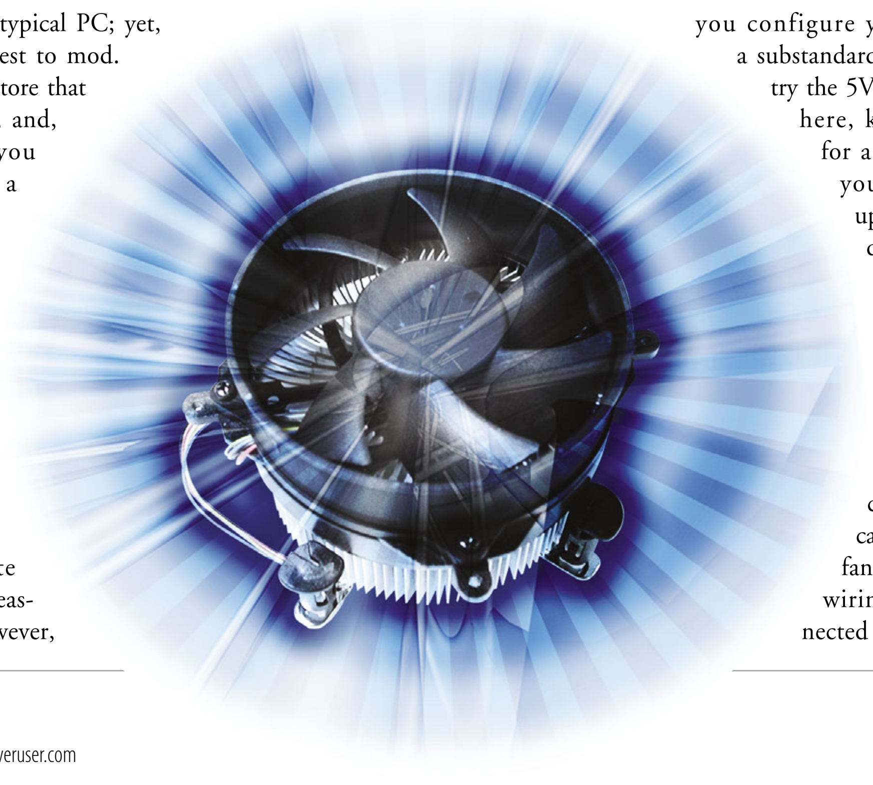
The Standard Disclaimers

Before we begin, we want to stress a few points. First of all, if your PC runs hot and you've had issues with overheating, don't perform these mods. You might want a quieter machine, but slowing down the fans will circulate less air through the case, making a hot system run hotter.

Also, the 7V mod below puts extra stress on your power supply. To supply 7V to a case fan, its positive and negative leads must connect across the +12V and +5V feeds coming from the PSU, which put extra strain on some of its voltage regulators. But if you have a high-quality power supply and aren't running more than two or three fans in a 7V configuration, you shouldn't have any trouble.

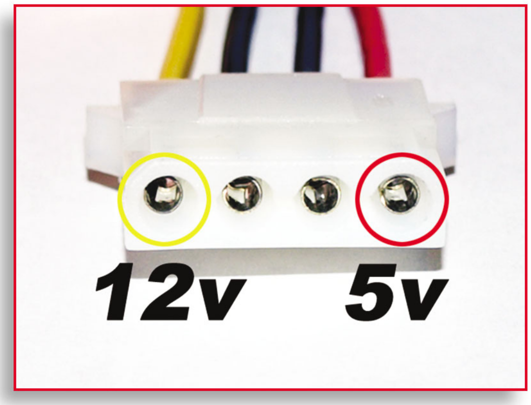
There's also a chance that a power supply's short circuit protection mechanism won't like a component connected across two positive leads, but since when is a mod risk-free? We can say, however, that over the years, we've performed this mod numerous times without incident.

We also want to emphasize that some fans don't operate reliably when you configure your PSU to supply a substandard voltage. Should you try the 5V or 7V mods outlined here, keep your case open for a while to ensure that your fans are spinning up properly. If the fans don't consistently spin up, it's best to revert back to a standard 12V configuration to prevent overheating.



12V Configuration

12V is the standard configuration for most case fans. Assuming the fan has standard colored wiring, the red lead connected to the fan's motor is



A standard 4-pin Molex peripheral connector has 12V (yellow) and 5V (red) leads, along with a pair of common ground wires (black).

positive, and the black is negative. In this configuration, the fan's positive lead mates with a peripheral connector's yellow, +12V wire, and the negative lead connects to either of the peripheral connector's black, common ground wires. With a 12V feed supplied, the fan will spin at its maximum rated speed and airflow.

5V Configuration

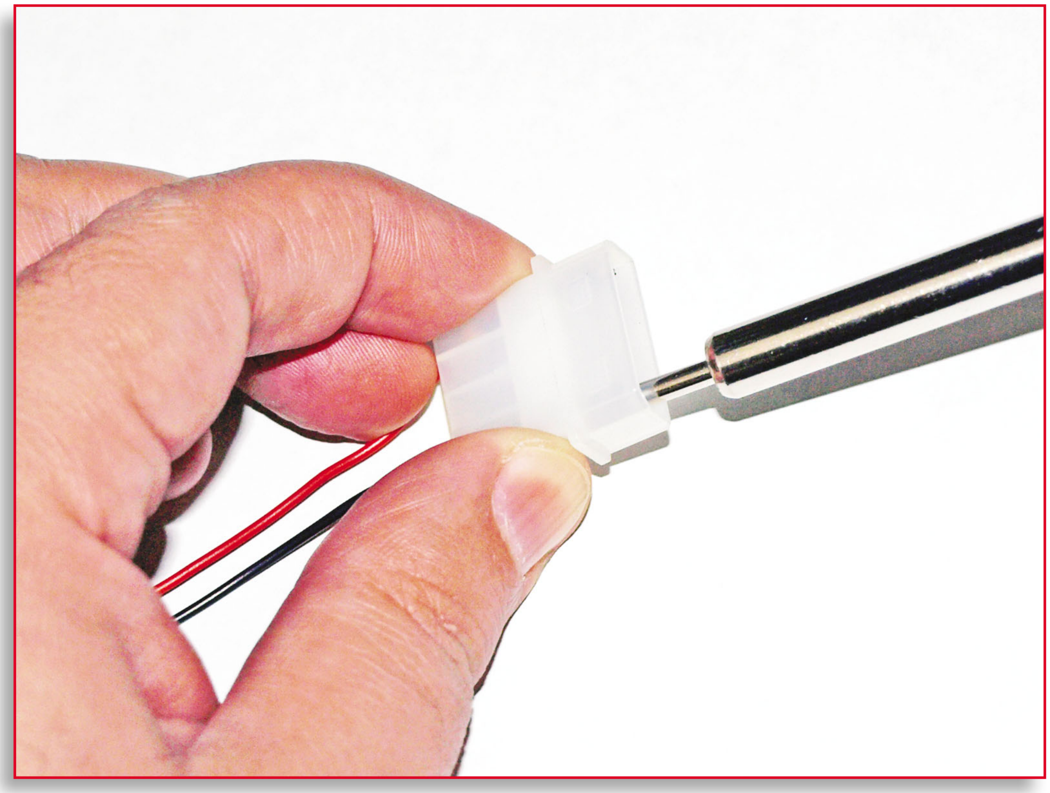
The 5V (and 7V) configuration requires a modification to the fan's wiring. To perform this mod, we recommend using a PSU pin removal tool to speed the process and minimize your frustration. Pin removal tools are available at numerous online retailers for just a few dollars. Though in a pinch, it's not absolutely necessary to use a pin removal tool.

If you look at the pins in a female peripheral connector (the type of connector usually attached at a case fan), you'll see four flared barbs at bases of the pins that lock them in place. When the barbs are flared out, it's impossible to pull them back through the connector without damaging the pins or wiring. A pin removal tool depresses these barbs so the pins are no longer locked in place. If you don't have a pin removal tool, you can use a small flathead screwdriver to bend the barbs inward, letting you push the pin back through the connector. Just remember to flare the barbs back out before reinserting the pins so they'll stay in place. We've also used the plastic tubing from inside some ballpoint pens as a pin removal tool.

To perform the 5V mod, pair the fan's positive lead (red) with the power supply's +5V lead, which also happens to be red. Using the pin removal tool, we removed the pin connected to the fan's positive lead, moved it to the other end of the connector, and reinserted it.

7V Configuration

The 7V mod is a little trickier and may seem a bit counterintuitive to the electrically inclined. To perform the 7V mod, you have to move the fan's negative lead to a new position in the connector. Using the pin removal tool, we dislodged the fan's negative lead (black) and reinserted it to the far side of the connector, opposite to the positive lead (red). With the fan's wires in this position, the fan's positive lead mates with the PSU's yellow +12V wire, and the fan's negative lead mates with the PSU's red +5V wire. This may sound strange to some of you because it seems like we're shorting two positive rails and the fan's negative lead isn't connected to a common ground. But, in practice, this configuration results in a net of 7V running through the fan's motor (12V – 5V = 7V). This, as we've already mentioned, slows the fan down to reduce its noise level.

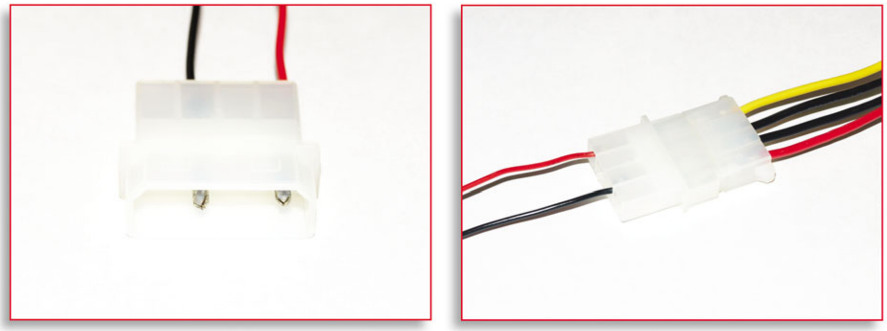


A pin removal tool, available for about $5 online, makes removing and relocating pins in a peripheral connector quick and easy. If you don't have one, a small flathead screwdriver can remove pins by bending the metal barbs that hold them in place out of the way.

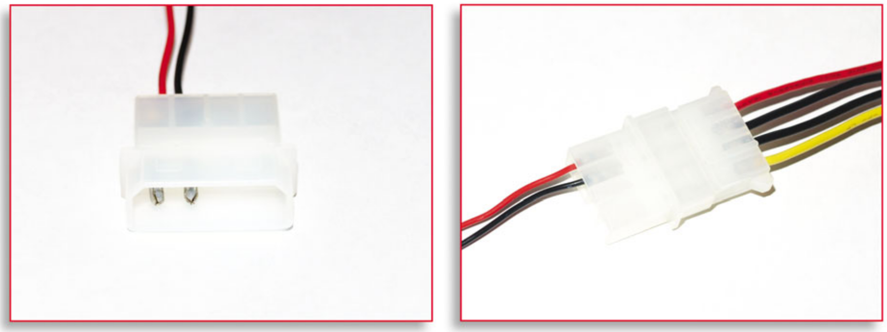
Other Possibilities

The more adventurous of you out there may be wondering what type of additional magic you can work using PSU's other rails; there are, after all, more than just the +12V and +5V rails available in an ATX power supply. And in fact, there are a number of other effective voltages that become available by bridging wires in the power supply's 20-/24-pin main ATX power connector. 8.7V, 17V, and even 24V configurations are possible using combinations of the power supply's rails. However, we wouldn't recommend experimenting with these wiring configurations. Typically, a power supply's -12V and 3.3V rails can't handle significant loads, so we don't advise connecting peripherals to them that they're not designed to support. It's also far more difficult to modify and make new connections in a 24-pin ATX power connector safely. Ultimately, the risks are greater than the rewards, so we recommend sticking with either the 5V or 7V mods. ▲

by Marco Chiappetta



In a standard 12V configuration, the case fan's positive (red) and negative (black) leads connect to the yellow (+12V) and black (ground) wires coming from the power supply.



Running a case fan at 5V will slow and quiet it down significantly. To do it, connect the fan's positive lead (red) to the +5V (red) feed in the peripheral connector. The fan's negative lead (black) connects to either common ground.

Performance:
The Net Effect

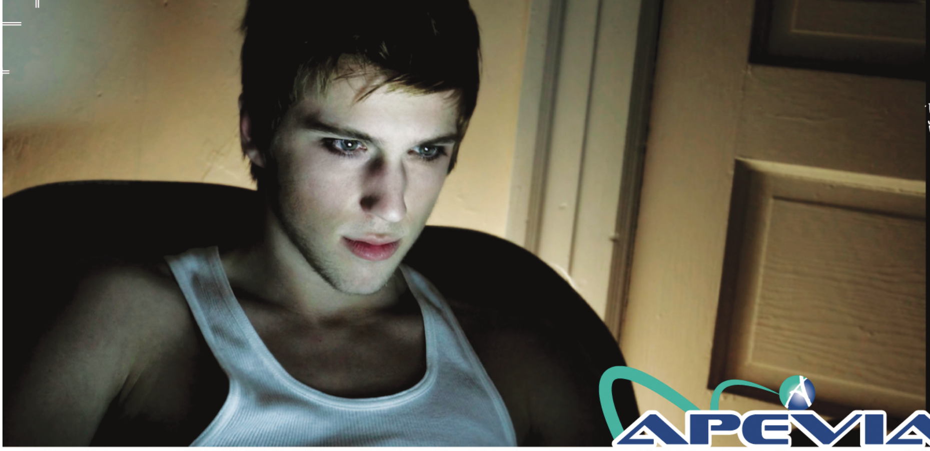
We're certain many of you are wondering how effective these mods are at silencing case fans (and the impact they'll have on a system's cooling performance). Unfortunately, it's difficult to gauge exactly how much air a fan will move when a less-than- optimal voltage is applied.

Let's use a 120mm fan that moves 50cfm of air with 12V applied as an example. Using some simple math, we can estimate that, theoretically, with 5V applied that same fan will spin at roughly 42% of its rated speed and move about 20.8cfm of air. And with 7V applied, the fan will spin at approximately 58% of its maximum speed and move an estimated 29.1cfm. Those are some big drops in speed and performance, which will no doubt have an effect on case temperatures. If your machine is running at relatively low temperatures, however, sacrificing some cooling performance in the name of silence is well worth it.

For some more tangible performance metrics, we also measured the noise levels and power consumption of an Evercool 120mm case fan when running in 12V, 7V, and 5V configurations. To test the power consumption, we connected only a single fan to our power supply and plugged the PSU into a power meter to measure total consumption at the outlet. The fan consumed 33W, 25W, and 22W at 12V, 7V, and 5V, respectively.

We also monitored the fan's noise output using a digital sound level meter. For the noise testing, we positioned our sound level meter about 3 feet away from the fan; any further and the meter had difficulty distinguishing fan noise from ambient noise in the room. At 12V, 7V, and 5V, the fan registered 40.8dB, 44.3dB, and 53.7dB, respectively.

As you can see from our results, lowering the fan's supply voltage results in significant reductions in power consumption and noise. If your system can handle the modifications, they're an effective way to quiet things down without sacrificing much in terms of cooling performance. ▲



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Mad Reader MOD

The Beauty Is In The Details

Any boutique PC shop will tell you that attention to detail is critical when building a luxury PC, and the same holds true for modding. Poor cable management, sloppy paint jobs, and jagged window cuts can turn a great concept into an ugly PC that cries in shame at the thought of going to a LAN party. Paul Patacao is a modder who takes details seriously. In fact, his latest mod's name, Insanity, owes its inspiration to "the amount of time and money spent to make everything perfect," according to Patacao.

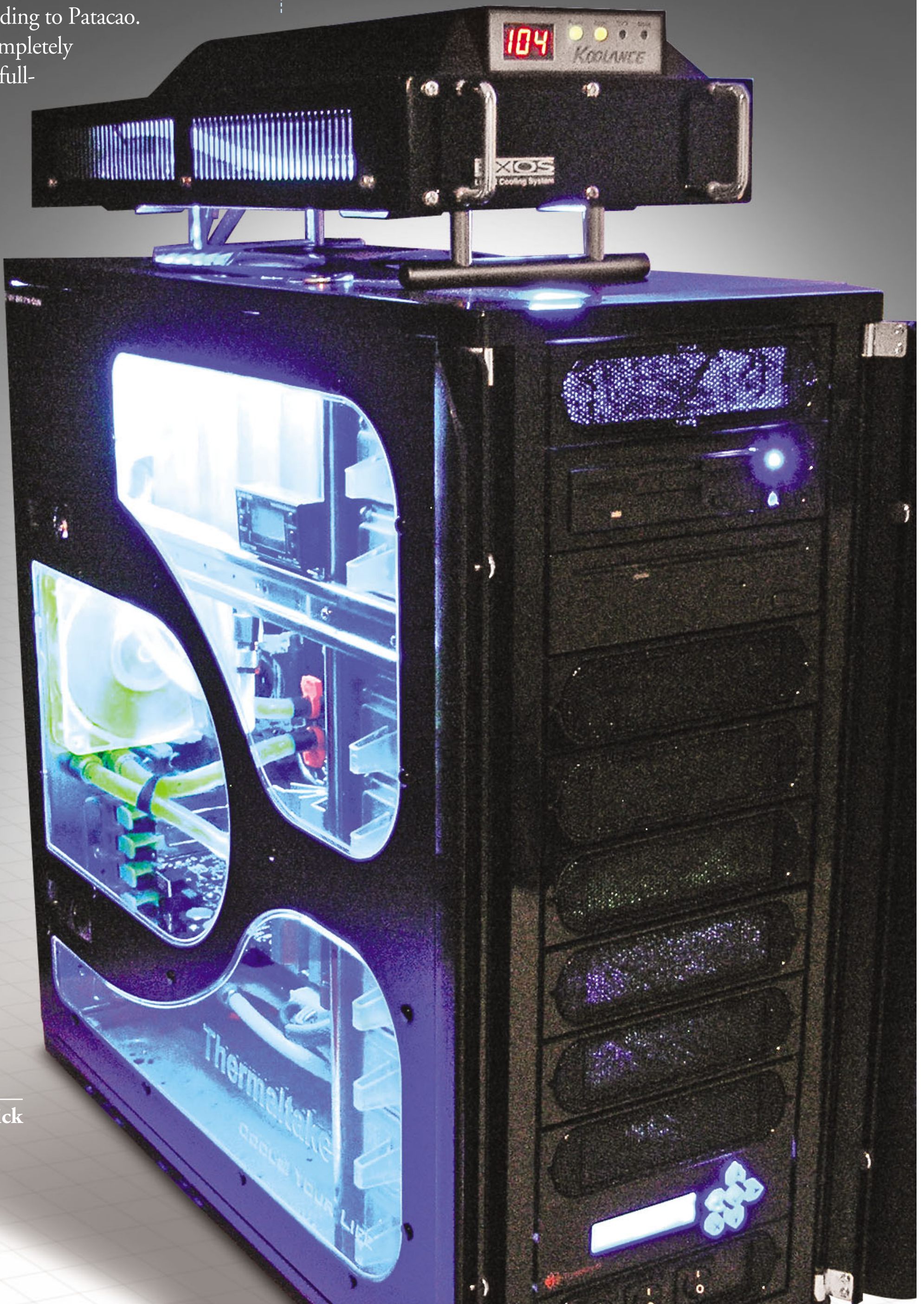
The modder kicked off his Insanity project by completely disassembling a Thermaltake Armor VA8000 series full-tower case. Patacao promptly sent the interior pieces, such as the motherboard tray and support rail, to a local shop to be nickel-plated. "It took about four days to complete due to such a small job," says Patacao. "Normally this process is done for corrosion protection, and I chose it for its finished industrial look rather than just chrome plating." Once he received the nickel-plated parts, Patacao reassembled the case with hex-head anodized fasteners.

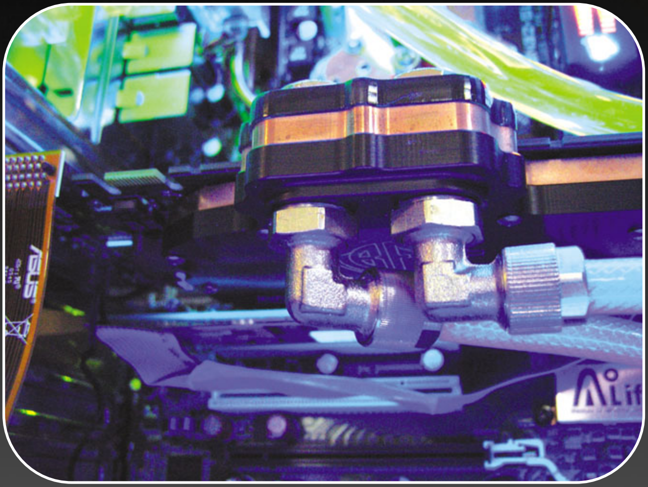
"As an electrician (IBEW local 164), taking pride in clean, neat, and professional workmanship is a daily goal," Patacao says. With that in mind, he set two goals for Insanity's interior: clean wiring and efficient liquid-cooling loops. Patacao spent plenty of time shortening and lengthening wires. He drilled holes into the motherboard tray so he could hide many of the wires at the back of the system.

Patacao didn't put all this effort into a pokey Web-surfing machine—Insanity is a gamer. The system includes a dual-core AMD Athlon 64 FX-60 processor, an Asus A8N32-SLI Deluxe mobo, three 500GB Seagate Barracuda hard drives, and a 768MB BFG GeForce 8800 GTX watercooled graphics card. Once he installed the components, Patacao focused on the watercooling loops. The modder built one loop to handle the processor and then assigned the Koolance EXOS^2 to the video card. Thanks to Patacao's work, the Insanity runs cool, plays hard, and looks good the whole time. ▲

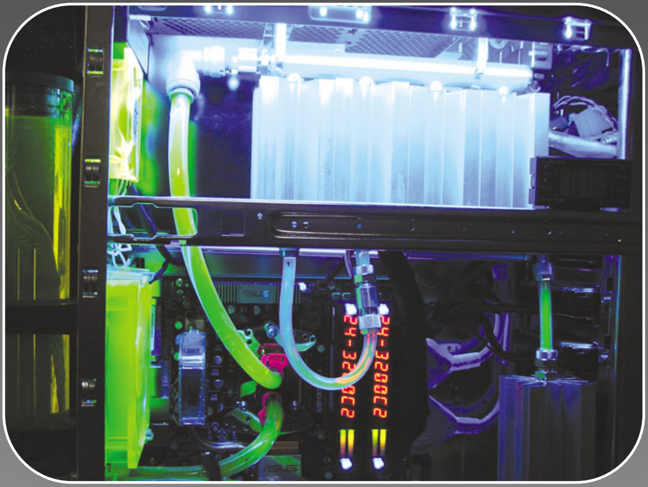
by Joshua Gulick

Thanks to an ultra-clean wiring job and a custom watercooling setup, Insanity boasts an airy interior. "I started out by helping my brother-in-law mod his rigs and it started to become my obsession," says modder Paul Patacao.

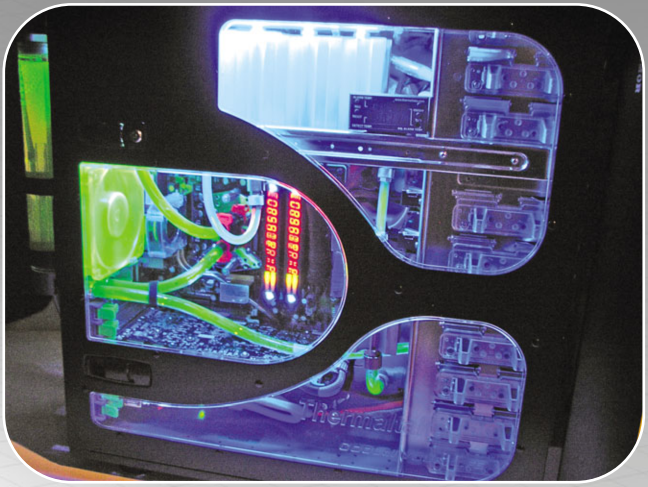




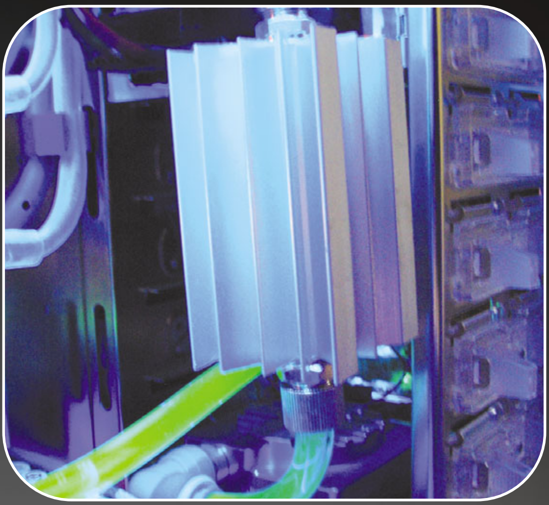
Patacao points out that you can save your graphics card warranty by buying a version that has a preinstalled waterblock, as his BFG GeForce 8800 GTX does.



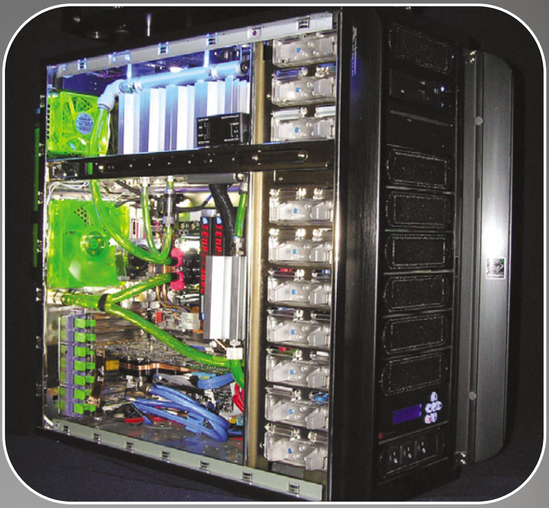
The Innovatek Kovekt-O-Matic MAXI Passive Radiator was too big for Patacao's PC, so he cut the cooling unit in half and then rebuilt it. The modified radiator now sits inside the Insanity PC, bathed in a blue glow.



Patacao tells us that managing the system's wiring was one of his biggest challenges. "The main power connections on the motherboard were wrapped with a cable tie Velcro tape made by 3M," says Patacao. "It's used for wiring harnesses, and it keeps it all clean and neat."



A portion of an Innovatek radiator sits near the side panel window. Behind the passive cooling device sits a PolarFLO pump. It's nestled at the bottom of the external drive bay area. "I still have three spare bay slots," says Patacao. "This is the reason why I like to use full-size cases."



The display for an Innovatek temperature sensor sits atop the horizontal support rail. The display is visible through the window when you attach the side panel.

Give Us Your Mod

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> “In reality, game developers can and will occasionally push the envelope with their new game engines in an effort to show the amazing effects that can be created with cutting-edge pixel shaders.”

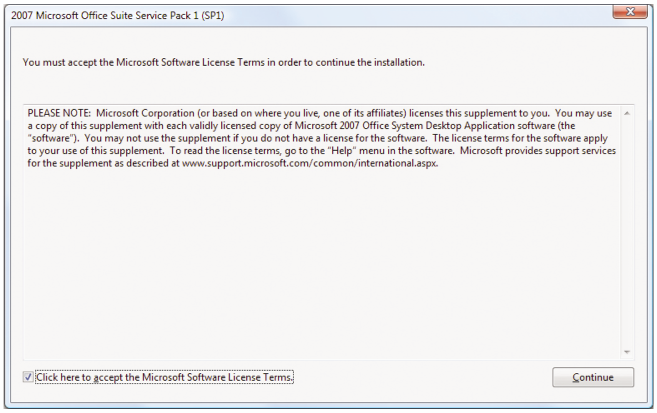
Each month, we dig deep into the mailbag here at *CPU* in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable? *CPU*’s “Advanced Q&A Corner” is here for you.

Charles T. asked: I maintain a few systems for my church and have a question about Microsoft Office 2007. When we first set up these machines, they ran Windows XP with Office 2003. Local kids use some of the machines in an after-school program and always seem to screw something up. Over time, I found myself reinstalling Windows and Office quite often. So, to save time when redoing the systems, I learned how to slipstream updates into my WinXP and Office 2003 discs so they would get installed automatically and I didn’t have to wait for downloads every time I had to reinstall. This month, we decided to update about half of the systems with Windows Vista and Office 2007 so the kids can get some experience with the latest software, and I want to do the same thing with my Office 2007 disc now that SP1 is out. I noticed that the Office 2007 CD contains an Updates folder, which in turn contains a text file with the message, “Any patches placed in this folder will be applied during initial install.” I assumed that if I placed the Office 2007 SP1 download into this folder, it would install automatically as the text file says, but it’s not working, and I can’t find any easy-to-follow instructions online that explain what to do. Can you help?

A: Of course we can help, Charles. Maintaining a lab means we have to do fresh installations of Windows on a regular basis, too, and having all of the necessary updates installed automatically from the get-go saves us a lot of time. You were actually on the right track, but missed a crucial step in the process. We’ll start from the beginning.

The Service Pack 1 download Microsoft released for Office 2007 is an executable file with the familiar .EXE extension. If you place an EXE file in the Updates folder in your Office 2007 installation image, it won’t get installed automatically because the Office 2007 installation looks for files with an .MSP extension. You can’t simply change the extension of the download, however. The patch files that actually comprise the SP1 download have to be manually extracted, which will decompress the individual MSP files within.

First, create a couple of folders on your C: drive; name one folder Office_cd and the other Office_sp1. Then copy all of the files on your Office 2007 disc into the Office_cd folder (C:\office_cd) and copy the SP1 file you downloaded into the Office_sp1 folder (c:\office_sp1). Once all the files have been



2007 Microsoft Office Suite Service Pack 1 (SP1)

You must accept the Microsoft Software License Terms in order to continue the installation.

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You must extract the files within the Service Pack 1 redistributable download for Microsoft Office 2007 before they can be automatically integrated into the installation process.

copied, click the Vista Orb, type cmd in the Start Search field, and then press ENTER. In the resulting command prompt window, type the following at the prompt and press ENTER:

```
c:\office_sp1\office2007sp1-kb936982-fullfile-en-us.exe
/extract:c:\office_cd\Updates\
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You'll then be asked to accept the Microsoft Software License Terms. If you do, SP1 will be extracted into the Updates folder and you'll have the necessary MSP files. You can then burn all of the files in the Office_cd folder to a new disc, and when you run the installation, SP1 will install automatically. This is a different process than slipstreaming, but it serves essentially the same purpose. We should also note that the contents of the Office_cd folder are too large to fit on a CD once SP1 has been extracted within. You'll have to burn the files to a DVD if you want to run the installations from a disc.

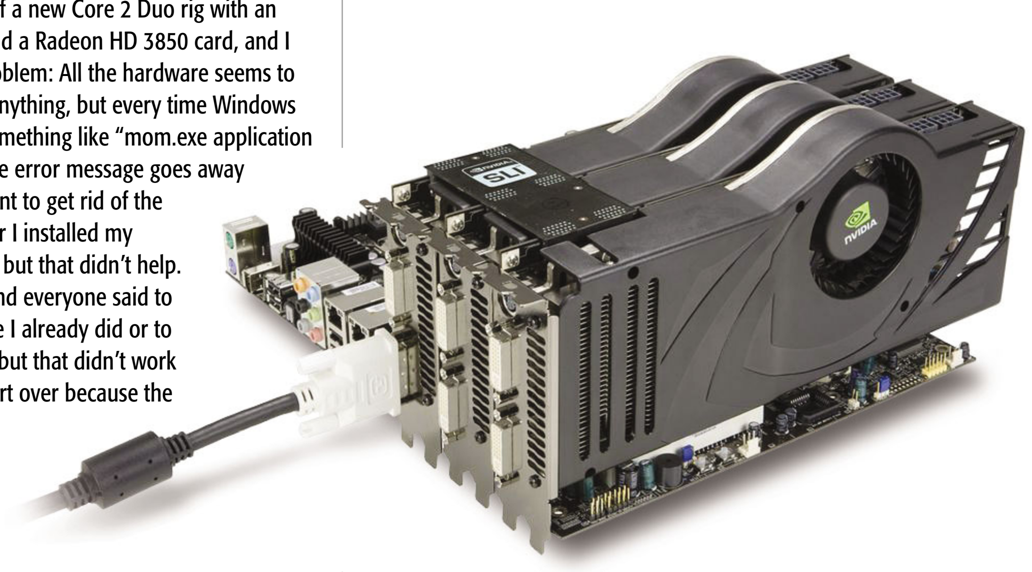
Rob R. asked: I just built myself a new Core 2 Duo rig with an Asus Blitz Formula motherboard and a Radeon HD 3850 card, and I love it, except for one annoying problem: All the hardware seems to work perfectly with no crashes or anything, but every time Windows XP loads, I get an error that says something like "mom.exe application error (0x0000135)." If I click OK, the error message goes away and everything works fine. But I want to get rid of the stupid message! It started right after I installed my video drivers, so I reinstalled them, but that didn't help. I searched the Web for the error, and everyone said to either reinstall the video drivers like I already did or to install the .NET framework to fix it, but that didn't work for me. I'd hate to reformat and start over because the system works great otherwise.

A: It's your lucky day, Rob! We've seen this one many times. The information you found during your Web search was right, sort of. You'll get this error if you install a recent ATI Catalyst driver release that includes the Catalyst Control Center without first installing the Microsoft .NET framework.

There are multiple ways to fix this error, but here's the easy route: Download a copy of CCleaner from www.ccleaner.com and install it. CCleaner is a great, free utility for cleaning . . . stuff . . . from your PC. Then uninstall the ATI drivers, restart your system, and run CCleaner. When the program opens, click the Cleaner tab and then click the Run Cleaner button to eliminate any temporary or abandoned files from your system. Then click the Registry tab and once more on the Scan For Issues button. CCleaner will likely find a multitude of issues. (This is normal the first time you run it.) Click the Fix Selected Issues button and CCleaner will ask you to back up your Registry before making any changes. Make the backup as a precaution and then click the Fix All Selected Issues button in the new window that opens. CCleaner will comply. When it's done, click the Scan For Issues button again and repeat the steps until CCleaner can't find more issues to fix.

Once CCleaner is done doing its thing, hit the Windows Update site and make sure you have the .NET framework 1.1 and 2.0 installed (along with all of the necessary security updates). When you've got them installed, restart the system and reinstall your video drivers, and you should be all set.

Brent S. asked: I must have a bottleneck somewhere in my system. I'm running an Nvidia SLI setup, and no matter what I do, I can't run Crysis on Very High or even High settings. Am I lacking processor power? I even bumped my RAM to 2GB of Corsair XMS Pro memory. The game wants to set my graphics settings to Medium at best, even though I have two GeForce 8800 GTS 640 cards running. Is an Athlon 64 X2 4200+ just not enough juice? Is my motherboard too old? When I bump the graphical settings up to High, the game gets choppy and glitchy. Do I need to upgrade to a Core 2 Duo or Core 2 Quad CPU? For heaven's sake, I even have a pair of WD Raptor drives RAID 0 striped with my swap file running



Three of Nvidia's GeForce 8800 Ultra cards in a 3-Way SLI can run Crysis at 1,920 x 1,200 with in-game graphics settings cranked to Very High, but you'd be spending a lot of money for minor gains in image quality.

on a separate Raptor drive. It just doesn't make sense that I can't run this game with all settings maxed out!

A: We feel your pain, Brent. This is an all-too-common question on forum boards, and a lot of folks really pull their hair out over it. Our advice is to set the game to Medium settings and move on. Now, before you get all excited that we're implying you should let your dual GeForce 8800 GTS cards go to waste, take our word for it: We're not. The simple fact is this game engine set on Very High or even just High settings is too much for even the fastest GPUs currently on the market if you're looking to run at 1,280 x 1,024 or higher resolution, as most gamers are. You could drop in a pair of GeForce 8800 Ultras and *still* not get decent frame rates on Very High graphics settings at 1,280 x 1,024. Crysis is just one of those games that is slightly ahead of its time. All too often, we get lulled into thinking that we have more than enough processing or CPU horsepower available to run virtually anything we want. In reality, game developers can and will occasionally push the envelope with their new game engines in an effort to show the amazing effects that can be created with cutting-edge pixel shaders. In other words, just because it's a menu option doesn't mean that you're going to be able to run the game at those settings unless you have a workstation-class system on your hands.

Your Athlon 64 4200+ is probably getting a little bit outdated at this point, but Crysis places a much greater load on the GPU than it does your CPU. Again, we'd recommend turning your resolution down to 1,280 x 1,024 or 1,680 x 1,050 (widescreen format) resolutions and setting graphical options to Medium. On Medium settings at 1,680 x 1,050 with 2XAA enabled, the game engine will consume 428MB of your available frame buffer memory. Because the game's textures are duplicated on both cards, even SLI isn't going to help; Crysis cries out for next-generation graphics cards with 1GB of onboard memory.

Also, note that setting Shaders Quality, Shadows Quality, and Postprocessing Quality (motion blur and depth of field) to High can dramatically affect performance in an adverse way. Try experimenting with the game's in-game menus for some of these settings and you'll see some nice performance gains. We're personally fond of disabling motion blur, since the effect doesn't translate as well in games just yet, in our opinion, like it does in film or even film animation. Setting Shadows Quality to Medium also looks good to us, as well.

Finally, Nvidia has notified us that Crytek and EA will be releasing a patch for Crysis that will provide a performance boost for multi-GPU setups. When that patch is available, you should be able to dial things up a bit more, but don't expect to run at 1,920 x 1,200 resolution on Very High settings.

At this point, it would take the power of three GeForce 8800 Ultras in 3-Way SLI mode to accomplish this feat. And frankly, you'd reach a point of diminishing returns there. Very High graphics settings in Crysis don't look that much better than High or Medium settings; certainly not enough to justify dropping upwards of $1,800 on your graphics subsystem alone, and all for a single game.

Timmy asked: **I started to build a new computer about a year ago, then abandoned it due to my financial situation. I bought an Asus P5W DH Deluxe motherboard back then, so I was wondering what processor would you guys recommend for it now? Cash is still a little tight, so I want something that's a good value for the money. I was thinking about the Core 2 Duo E6700. I was also thinking the E6850, but the bus speed on that is 1,333MHz and my motherboard says the maximum bus speed it can handle is 1,066MHz, so that wouldn't work, would it?**

A: You're on the right track, Timmy, but we'll offer another option for you here, as well. You're correct that the 975 Express chipset on that Asus motherboard only "officially" supports up to a 1,066MHz FSB. Though the board can in fact run a Core 2 Duo E6850 on a 1,333MHz FSB through a BIOS menu option, you're better off going with more CPU cores for added multithreading performance vs. a higher bus speed. We'd also suggest taking a look at the Core 2 Q6600 quad-core. It runs on a 1,066MHz FSB, too, and will put two more processing cores at your disposal and better future-proofing, as multithreaded applications continue to become more pervasive in the mainstream. ▲

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by Dave Altavilla and Marco Chiappetta,
the experts over at HotHardware.com

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Gibson's Robot Guitar

Automated Tune-ups

If the term Robot Guitar makes you think of a silver-plated humanoid robot guitarist drawing screams from adoring young female robots during a rock concert, we can inform you that you're way off base. Robot Guitar also isn't a musical instrument that automatically turns a novice guitarist into the next Eddie Van Halen or Jimi Hendrix. (Unfortunately, it won't even turn you into a Guitar Hero expert.)

What the Robot Guitar from Gibson *does* do, however, is still impressive: It can automatically tune itself, even after you change strings, giving the beginning guitarist some help in playing in tune. It also can give more experienced guitarists access to six altered tuning setups. The additional tuning setups simplify the process for guitarists to play in nonstandard tunings that are found in some popular songs. (Guitarists looking to play the occasional songs with alternate tunings often use more than one pretuned guitar because of the difficulty of achieving the desired tuning.)

Gibson released 4,000 limited edition Robot Guitar Les Paul models in December 2007 for about $2,500 each. Standard Robot Guitar models should appear in the first quarter of 2008 at a cost of less than $1,000.

German engineer Chris Adams and his company, Tronical, worked on the electronics behind the Robot Guitar for about 10 years before coming up with the PowerTune system, which provided the technology behind Robot Guitar. Gibson and Tronical finalized the system for the Robot Guitar, and Gibson is the exclusive distributor of the Robot Guitar.

The Robot Guitar falls out of tune about as often as any other guitar.

In Tune With Robot Guitar

Guitars fall out of tune for a few different reasons. Environmental changes—temperature and humidity—can cause the guitar and strings to expand and contract slightly, which changes the sound the instrument generates, and it can fall out of tune. New strings must have the slack worked out of them, and they will more easily fall out of tune until they've been used several times.

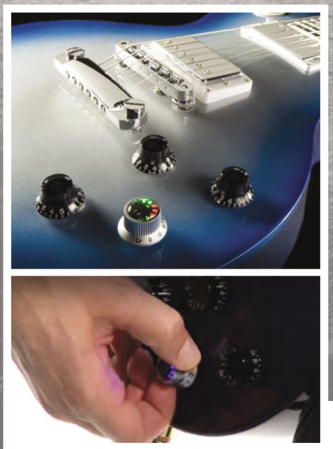
Tuning the guitar by hand involves testing one string against a set pitch. Once that string is in tune, you then can tune the other strings against the first string. To adjust the pitch of an individual string, you must turn the tuning peg associated with the string. A tighter string generates a higher pitch. Tuning by hand can be a time-consuming and frustrating process, one that the Robot Guitar aims to simplify.

The Robot Guitar makes use of a simple colored LED light system to give the guitarist information on the tuning process. The color and status (flashing or solid) of the LEDs on the master control knob inform you about the tuning process.

Guitarists pull the master control knob (**1**) away from the Robot Guitar body to activate the automatic tuning system. (When the knob is in its normal position, flush to the guitar body, it works as a normal volume or tone pot.)

The guitarist then must lightly strum the strings, allowing the onboard system to measure the frequency and determine which adjustments it needs to make. If the onboard system measures the strings to be out of tune, the LEDs turn red (**2**).

The Robot Guitar contains an extra set of pickups (**3**) used exclusively for tuning. Most electric guitars use magnetic pickups to measure vibrations and generate sound; however, the Robot Guitar uses a set of piezoelectric pickups for the tuning process. Using piezoelectric pickups allows the system to better isolate the sound of each individual string (a necessity in tuning) versus using a magnetic pickup. (Piezoelectric pickups appear more often in acoustic and semi-acoustic guitars.) The DSP electronics system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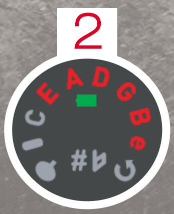
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Sources: Gibson, Tronical

Gibson offered the first Robot Guitar model, shown here, for $2,500 as a limited edition.

However, Adams says in a press release that guitarists using the automated tuning system become more aware of when their guitars fall out of tune.

"Now that (tuning) is no work, you tend to use this much more often," Adams says. "Once you get used to the system, it becomes second nature."

Although the Robot Guitar has sparked a lot of excitement and buzz among musicians, some guitarists have criticized the idea of an automated tuning process, saying guitarists should always know how to manually tune their instruments. Manual tuning is part of the process involved in learning to play a guitar properly, they say. They may be right, but then again, writers used to say the same thing about using a dictionary versus using the spell check command on the computer . . . and we all know how that debate has resolved itself. ▲

by Kyle Schurman

in the guitar body then measures the frequency of each string, determining if it needs to make any adjustments.

The automated onboard system then turns the tuning pegs (called Powerheads on the Robot Guitar), using small motors in the back of the guitar's head (**4**) that adjust the tightness of the strings. As you can see in (**5**). the upper photo shows the pegs before the on-board system tunes the Robot Guitar. The lower photo shows the pegs after the tuning process, and you can see how a few of them have changed positions.

Interestingly, the guitar strings carry the electrical signals and instructions from the onboard system to the motors. (The amount of electrical current flowing through the strings is at a harmless level.)

After a few seconds, all of the strings are in tune (to standard A440 tuning), and the LEDs begin flashing blue (**6**). The guitarist pushes the master control knob back in, and the guitar is ready to play.

The onboard system consists of electronics hidden in a cavity in the back of the guitar body (**7**). You can see the location of cavity for the electronics on the back of the guitar (**8**), but the front of the Robot Guitar (**9**) doesn't look significantly different from other electric guitars. The electronics and small motors used in the Robot Guitar are lightweight and don't affect the sound the guitar generates.

The tuning system runs from a rechargeable battery pack. Gibson estimates you can run the tuning system around 200 times before needing to recharge the batteries. You also can manually tune the Powerheads by making a simple adjustment to each tuning peg. ▲

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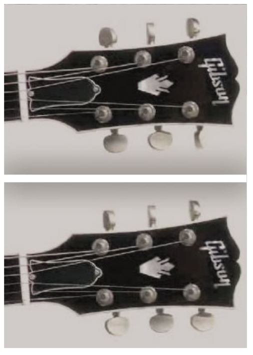

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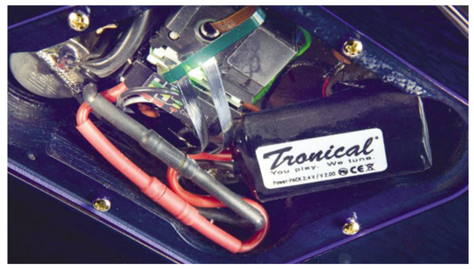

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Phoenix HyperSpace

Instant-On Computing Outside Windows

Hyperspace might be a fictional staple of science fiction and videogames, but it's one that carries a lot of weight for fans of the genre. Hyperspace is associated with one of the most popular sci-fi movies of all time, "Star Wars," and with one of the most popular early video games, Asteroids.

The latest version of HyperSpace, from Phoenix Technologies, actually has nothing to do with space travel (real or fictional), but it eventually might prove almost as popular with computer users as those early sci-fi movies and games.

HyperSpace is a technology that will provide instant-on capabilities to personal computers. Essentially, after you press the computer's Power button to boot the computer, you'll be able to press a hotkey and enter the HyperSpace environment, where you instantly can perform some basic tasks, such as accessing your appointment calendar or using the Internet. Windows continues to boot in the background while you work.

With HyperSpace, there's no more waiting a few minutes for the boot process.

Developing HyperSpace

You can think of HyperSpace as a layer of software that sits between the BIOS and Windows; it's an operating environment, rather than a full-fledged

Flying Through HyperSpace

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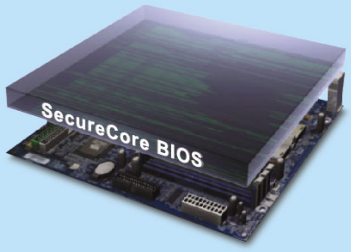

The BIOS loads as normal. Since its founding, Phoenix has placed its BIOS software (which serves as an interface between Windows and the computing hardware) into more than 1 billion computers.

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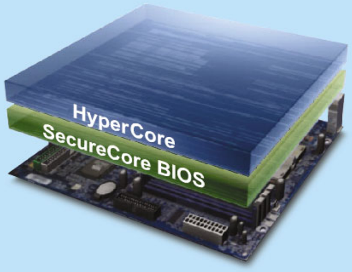
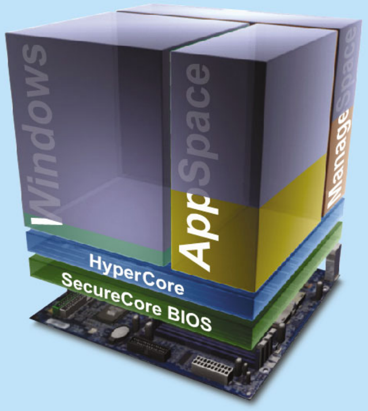


HyperCore loads, needing only a fraction of a second. HyperCore provides the base for the HyperSpace appliances to work with the BIOS.

3



With HyperCore in place, the HyperSpace components and Windows can begin loading. The ManageSpace loads first, and it allows troubleshooting capabilities. Through ManageSpace, an end user can allow a third party to take control of the user's computer and troubleshoot problems. Using ManageSpace, a third party could even adjust or update the BIOS if necessary. The user controls how and when the third party can control the machine.

Source: Phoenix Technologies

operating system. Because HyperSpace loads quickly on your PC, it provides the type of instant-on access to some features of your computer that you don’t have with Windows alone. HyperSpace can run scaled-down versions of a few open-source software packages, giving users immediate access to certain key capabilities.

“HyperSpace is a set of mechanisms that allows us to create an environment that runs side-by-side with Windows,” says Dr. Gaurav Banga, CTO and senior vice president of engineering at Phoenix. “It’s very predictable. It’s designed to be small and not vary at all. Independent of what Windows is doing at that time, your access times (with HyperSpace) will be small and very predictable.”

Unlike other applications that traditionally have run outside Windows (think “DOS prompt”), HyperSpace will make use of a graphical environment, rather than a text-based interface. Users should have no problems adjusting to the easy-to-use HyperSpace GUI.

Fixing Laptops

Phoenix says HyperSpace will fit well in the current computing marketplace because the market share of laptop computers continues to grow. Phoenix research shows that more than half of all business computers purchased will be laptops by 2009. At the same time, many companies make laptops, and the strong competition drives prices down. Laptop makers are looking for reasons to set their units apart in the market, and HyperSpace can give manufacturers some unique features.

“There’s nothing in HyperSpace that precludes it from working on desktop” computers, Banga says. “There’s just a greater need on the notebook side.”

Phoenix says although laptops are popular, they pose some annoying problems for users; problems that the company expects HyperSpace can fix, such as the following.

Long boot process. Depending on your computer’s configuration and hardware setup, you can spend two to four minutes waiting for Windows to boot in a full power-up situation and 30 to 60 seconds waiting for Windows to recover from sleep mode. It doesn’t sound like much time, but the Windows boot process can seem frustratingly long in certain situations.

Battery life. Laptop batteries never quite seem to live up to the longevity claims the manufacturer makes. Any power conservation feature is helpful for users.

Security. With the complexity of Windows, security problems can occur in a variety of areas. Banga says Windows’ security struggles in part because of its massive size.

“No matter how good your design is, Windows suffers from being very, very large,” he says. “No single person or group of people can describe all aspects of Windows. . . . Our environment is designed to be small, not a monolithic system that requires millions of lines of code.”

Finding solutions. When users have problems, they can be difficult to diagnose and fix, especially if Windows isn’t working properly.

HyperSpace Jumps In

HyperSpace can help with all four of these problems.

Instant on. HyperSpace is available for use just after you press the power button. It can run in the foreground while Windows loads in the background. With HyperSpace, you’ll have access to certain open-source software packages that the computer’s OEM chooses to include. For example, you might be able to immediately connect to the Internet through a Wi-Fi hotspot at the airport using HyperSpace.

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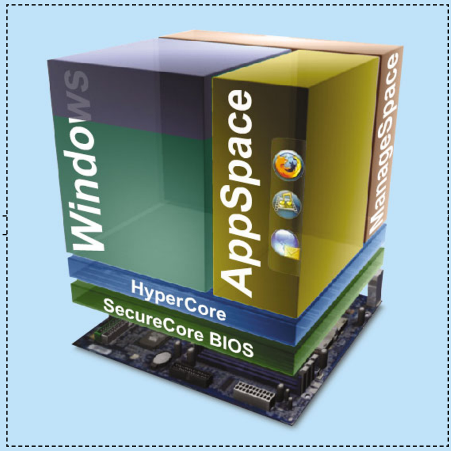

With the AppSpace loaded, users can begin running HyperSpace software packages. AppSpace is the area of HyperSpace containing the HyperSpace appliances. Even though Windows hasn’t fully loaded at this point, users can make use of the HyperSpace appliances to perform simple tasks such as using the Internet, playing a DVD, or checking email.

Steps 1 through 4 require a second or two to complete after you press the power button.

"Within a few seconds, while Windows is still booting, you'll have a screen to use,” Banga says. “It's one to two seconds from the time you hit the power button. From standby, it's about one second. It's truly instant-on."

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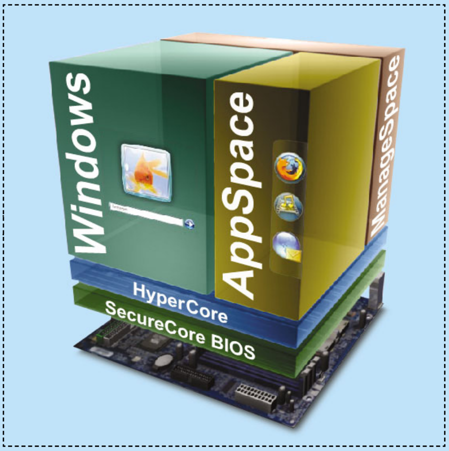


After a few minutes, Windows is fully loaded, and users can toggle between the AppSpace in HyperSpace and Windows.

“The Windows boot takes roughly the same amount of time” as it does in a computer without HyperSpace, Banga says.

Once Windows finishes loading, you can toggle between HyperSpace and Windows, using Windows as you normally would.

Instant-on capability is something consumers have become accustomed to with other tech devices, such as mobile phones and MP3 players, magnifying the frustration over a slow-loading Windows OS. Using the example cited earlier, computer users currently might have to wait three to five minutes for Windows to load and connect to the Wi-Fi hotspot when sitting in an airport with their laptops, which is not a great option when you need to check some information a few minutes before the final boarding call for your airplane. Faced with this situation, users might decide to forego the computer and use an instant-on Internet-enabled mobile phone or other mobile device (despite the limitations of those devices) to achieve faster performance. HyperSpace would give users the option of using the computer to check the Internet when time is a significant concern.

Conserving battery life. When using HyperSpace, you can leave Windows in suspended mode, which will conserve the battery. And you can toggle between Windows and HyperSpace, only using Windows (and extra battery power) when needed. Battery conservation has been especially tricky with Windows Vista.

The continued increase in market share for laptop computers versus desktops brings more attention to battery conservation problems and has sparked Phoenix's desire to release HyperSpace now.

"HyperSpace has a small footprint with limited appliances," Banga says. "We're not using as much battery power."

Providing security. Because HyperSpace works outside Windows, it isn't susceptible to the same security holes and virus attacks aimed at Windows. Eventually, antivirus software (which tends to make Windows run slowly) could run exclusively in HyperSpace.

"Windows gets larger and more powerful," Banga says. "However, that has come at a cost—a lack of security and unpredictability. . . . What we're trying to do is not take any of the power of Windows away; we're trying to augment the power."

Remote management. Using HyperSpace, end users can allow a service provider to easily control the computer remotely to fix problems, even if Windows isn't working. HyperSpace gives the end user the ability to completely track the work of the service provider, ensuring no problems.

Appliances vs. Applications

Although you'll run an application in Windows, Phoenix calls its applications in HyperSpace **appliances**. The name isn't the only difference, though.

Exclusivity. Appliances in HyperSpace only are shipped within firmware or on a protected disc. You can install Windows applications at any time, often through an Internet download. Obviously, the HyperSpace appliances are more secure.

The potential downside is users will not be able to easily change the appliances included with HyperSpace. Uninstalling software in HyperSpace will be extremely difficult, meaning you'll want to carefully make your initial choice of appliances in HyperSpace.

Size. The design of HyperSpace ensures its appliances must be small, allowing them to load and work immediately. Windows applications can require hundreds of megabytes of memory, and they can require several seconds or more to load.

Updates. HyperSpace appliances rarely will require updates, but when they do, Phoenix will only allow updates from secure Internet sites. In contrast, Windows applications sometimes require daily updates, which are especially important to avoid problems with viruses or security breaches.

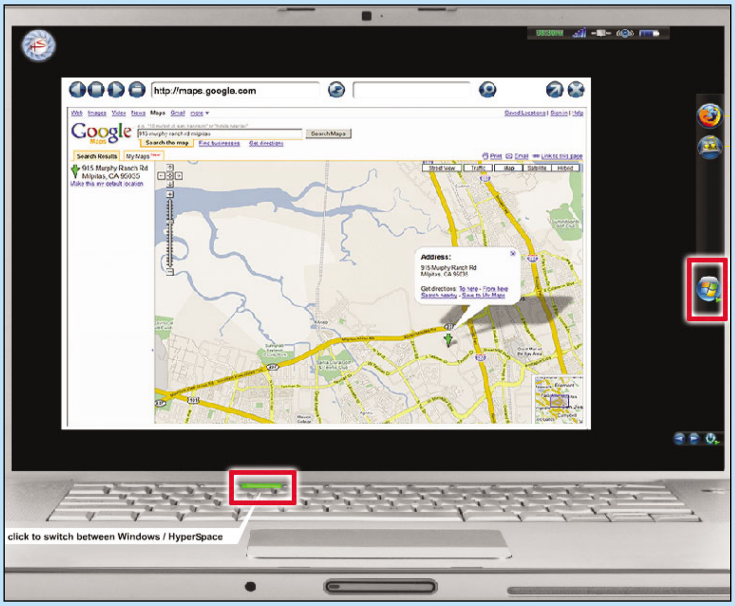
Putting HyperSpace To Work

One of the first ways HyperSpace may appear in the marketplace is among business users. For example, companies may want a HyperSpace appliance that is customized for sales people with contact lists, email access, and appointment calendars, giving them instant access to the computer tools they need to perform their jobs more efficiently.

Ultimately, though, the implementation of HyperSpace rests with OEMs. As with its BIOS, Phoenix will be providing the HyperSpace technology to OEMs,

Using HyperSpace

When running HyperSpace, you can select among a few appliances, such as the Web browser displayed here. Each available appliance appears as a button along the right side of the HyperSpace window.



Source: Phoenix Technologies

and those OEMs will decide how to make use of HyperSpace and which appliances to include.

"OEMs will decide what it looks like," Banga says. "You could imagine a lot of people spending 85 to 90% of their time on Web-based applications: email, IM, calendars, etc. Those people don't need desktop access. . . . We believe this is the missing link for making a Web machine."

Phoenix is in negotiation with 20 to 30 OEMs to begin including HyperSpace in their products, and HyperSpace-enabled laptops could be available for purchase after mid-2008. HyperSpace will be in the suite of products Phoenix makes available to OEMs, Banga says. Some OEMs may eventually choose to include HyperSpace on their motherboards, just as they do with the BIOS.

"We believe we are a company best suited to do this," Banga says. "We've been working below Windows for many years. It was an obvious thing for us to do." ▲

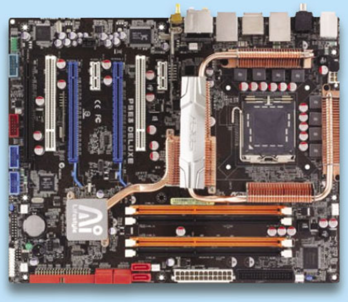
by Kyle Schurman

Other Instant-On Options

The idea of instant-on computing isn't exactly new.

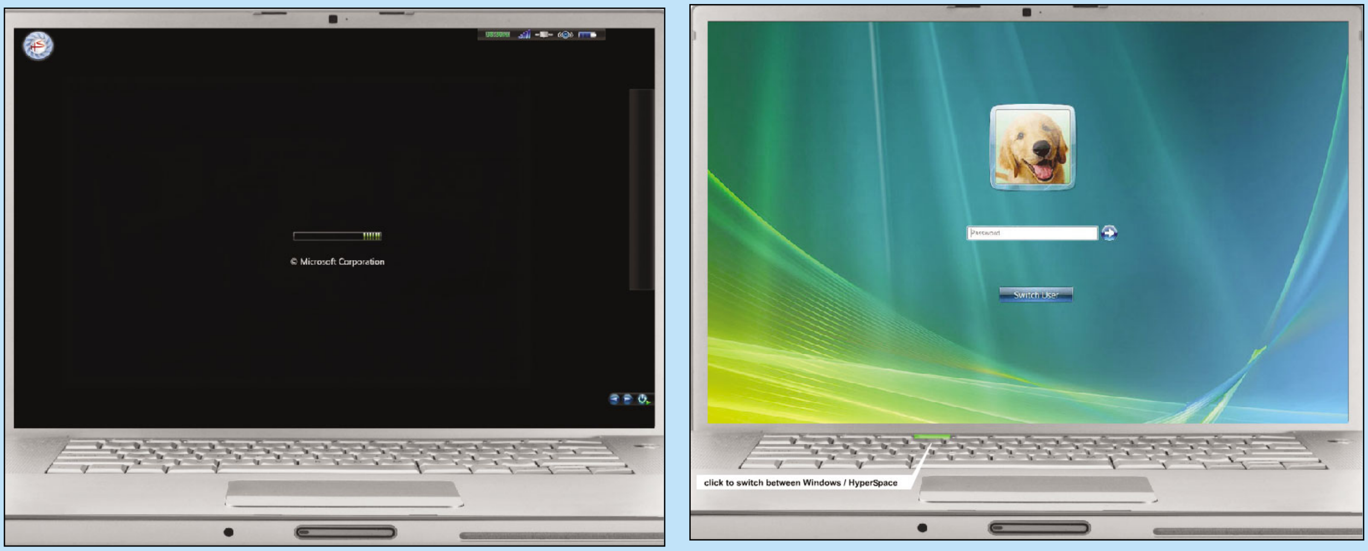
cME. Phoenix discussed an idea similar to HyperSpace almost five years ago, called cME (Core Management Environment). The cME software allowed for an instant-on computing experience, and it was designed specifically to allow Internet access and remote access for repairs. However, HyperSpace offers more features and a better graphical environment than did cME.

Splashtop. DeviceVM has developed Splashtop, an operating environment similar to HyperSpace. Splashtop boots from the BIOS and allows you to run scaled-down applications, such as a Splashtop Web browser. Splashtop must be built into the motherboard. Unlike HyperSpace, Splashtop runs completely separately from the operating system. While running Splashtop, Windows cannot be loading in the background. You cannot toggle between Splashtop and Windows as you can with HyperSpace. Splashtop is only available on an Asus P5E3 Deluxe/WiFi AP motherboard (which is shown here).

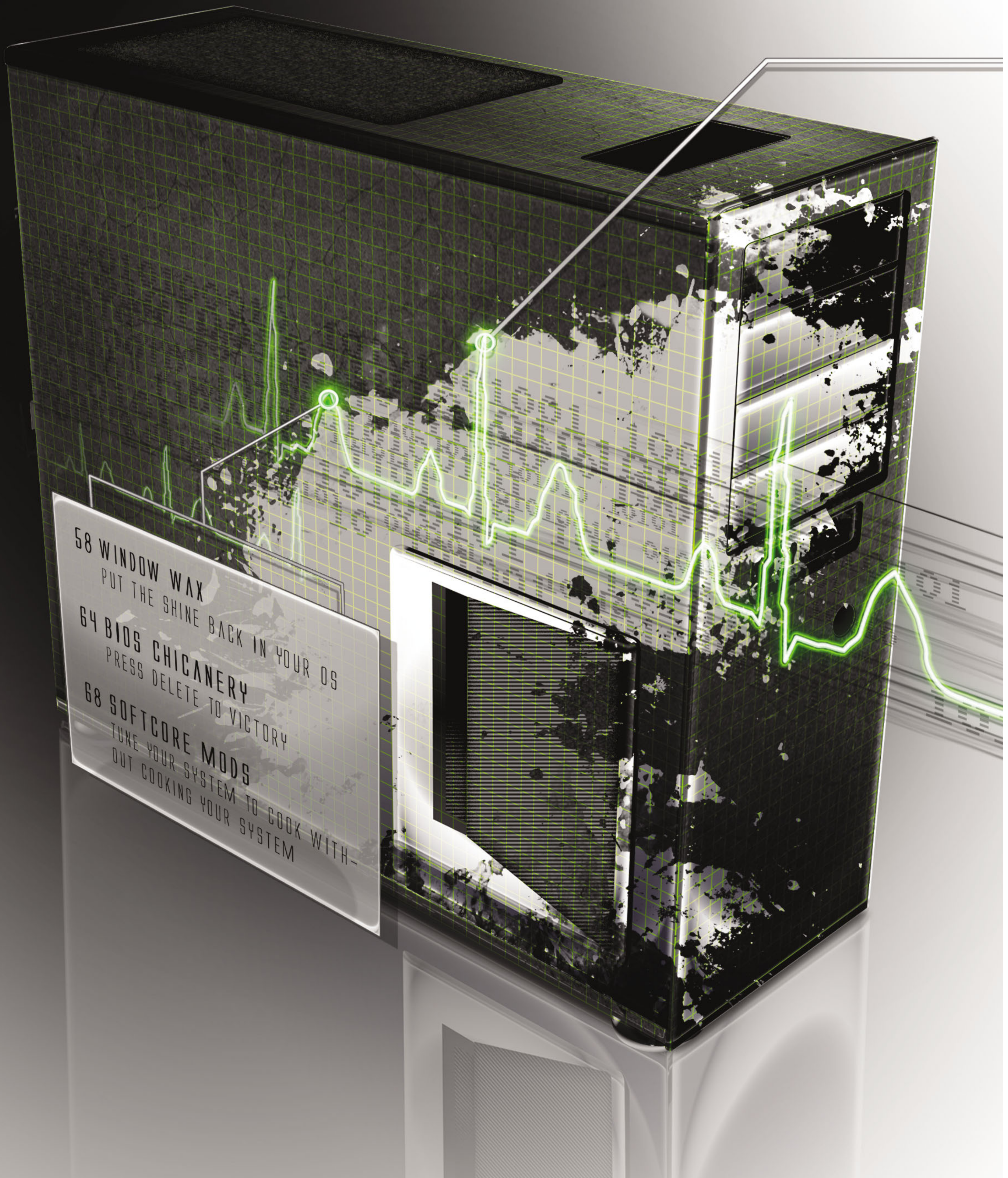


Vista SideShow. With Windows Vista, Microsoft has included the capability for SideShow, which allows you to check information on a secondary screen, even when the PC is turned off or is in sleep mode. You can access the information through "mini programs" that Microsoft calls gadgets, allowing you to quickly check a Web site or email, for example. A SideShow-enabled laptop likely would have a second, small screen built into the lid's exterior case, allowing access to the secondary screen even when the laptop is closed. However, such devices aren't appearing frequently yet. ▲

Source: Phoenix Technologies



As you're using HyperSpace, Windows loads in the background (above). You can toggle out of HyperSpace to check on the status of the Windows load by either clicking the Windows button along the right side of the HyperSpace window or by using a toggle key on the keyboard. Once Windows is loaded (above right), you can use either HyperSpace or Windows.



58 WINDOW WAX
PUT THE SHINE BACK IN YOUR OS
64 BIOS CHICANERY
PRESS DELETE TO VICTORY
68 SOFTCORE MODS
TUNE YOUR SYSTEM TO COOK WITHOUT COOKING YOUR SYSTEM

THE SIX MILLION DOLLAR PC

YOU CAN REBUILD IT; YOU HAVE THE TECHNOLOGY

It's no secret that we like to live on the frontier of high-performance computing. Whether it's volt-modding a graphics card, fashioning a custom case that blurs the line between form and function, or jumping in at the beta phase of the next killer app, we want to be first in line. Then again, we know you're camped out in the same line.

For us, PCs are far more than purely utilitarian appliances to help us work more efficiently and communicate more effectively. Think of our hobby as electronic thrill-seeking. The rush others get from BASE jumping or running with the bulls is the same rush we get seeing a wicked mod grow legs and take off.

Of course, a huge part of that rush is the potential for utter disaster. Pull the rip cord on your parachute too late, and you're a footnote in the history of poor hand-eye coordination. Take a wrong turn on the streets of Pamplona, and you'll be on the receiving end of a set of pointed horns powered by 1,000-plus pounds of bovine furor. For those of us who prefer slightly less life-threatening recreational pursuits, that's the equivalent of filling the basement with the sweet aroma of a smoking PSU. Live on the cutting edge long enough, and the cutting edge cuts back.

Because of the potential havoc certain warranty-vaporizing mods can wreak, you might be a little gun-shy tinkering with your CPU's voltage. We understand your sentiment, and in the words of Leon Phelps, "That's cool." There's nothing wrong with living vicariously through our glorious triumphs while avoiding our embarrassing defeats. For most, it's a matter of preserving your investment. Don't want to push your already ridiculously fast Core 2 Quad Extreme CPU? We don't blame you. To the best of our knowledge, Intel's trade-in policy on scorched silicon isn't too favorable for the consumer.

But where does that leave you, oh ye who demand the pinnacle of performance at stock settings? You don't deserve to be penalized because achieving better performance by making your system run smarter is less alluring than making it run faster. There are a lot of tricks within your OS and BIOS, for example, which you can use to give your system a shot in the arm. Of course you'll want to keep your system in tip-top shape by doing all the things a good little power user should do: Regularly run maintenance utilities and system diagnostics, ensure optimal air flow through your PC by routing cables out of the way, and keep your drivers, software, etc. updated. These practices should be as routine as stretching before a jog; it's the less obvious tricks that we're after.

We'll start with your OS. We know—insert Vista witticism here. Been there; done that; chuckled once or twice. Whether you're appreciating the fine wine status of WinXP or fully sipping on a Vista vintage, there are plenty of things you can do to whip Windows into shape. Think of it as getting a head start on Vista SP1 or further refining your WinXP experience.

What about the BIOS? Typically thought of as the overclocker's playground, you're doing yourself a disservice by not fully exploring your system BIOS, even if you don't plan to mess with your CPU multiplier. Believe it or not, some people (and perhaps you're one of them) purchase high-end mobos more for the plethora of ports, expansion slots, and onboard controllers than the performance-adjusting options, but everyone should fine-tune their BIOS for the best possible performance.

Finally, there are plenty of tweaks you can make to your existing hardware that don't involve turning the dial to "11," so to speak. Sure, overclocking is exciting, largely due to the aforementioned rush we get from it. But you can still "mod" your hardware without risking its destruction. There are plenty of no-nonsense hardware fixes to keep your machine humming along. Add these fixes alongside your regular maintenance regimen and reap the benefits.

Having a system that breaks benchmarks isn't within reach for everyone, but everyone deserves to have a system that's hitting on all cylinders. Get ready to walk the tightrope (above a very forgiving safety net). △

by Vince Cogley

WINDOW WAX

PUT THE SHINE BACK IN YOUR OS

It seems that every springtime, we prepare ourselves to clean Windows. Microsoft Windows, that is, the operating system we've all come to know and, if not love, then at least use every day. And 2008 is no exception.

This year marks the first spring that there's a decent chunk of Windows Vista users, although statistics indicate that Windows XP users are still the majority. As such, we'll be covering a lot of common tips that are just as effective for both Vista and WinXP, such as lightening the Startup program load and pruning background services to make lean, mean gaming and video-editing environments, among others.

As always, we're going to try to keep our supply of tips fresh. Be sure to check out our Web site for our Spring Cleaning articles of years gone by for the tips we don't cover here.

Stop Startup Programs

Plenty of the problems people have with Windows have to do with programs that automatically start up with Windows. Too many startup programs are either useless or unnecessary, conflict with each other or are redundant, or are incredibly resource-hungry and should be replaced with leaner alternatives. We'll cover how to find those programs, but for now, let's go over some ways to kill startup programs.

The cleanest way to kill a startup program is to tell the program itself to stop loading every time Windows starts. Usually, this means working with all those little icons in the Taskbar Tray, or just "The Tray." Try right-clicking the Tray icon of the program you want to stop loading automatically, and if there's such an option, click Close/Exit/Quit. Frequently, a pop-up menu appears asking if you want to permanently close a program—choose Yes. Other times, you may need to open the Setup or Preferences window for that program to permanently disable it. Choose Setup or Preferences from the pop-up menu after you right-click the icon and then look for an option to stop automatically loading at startup. You can undo this change later by using the program's same Preferences or Setup screen.

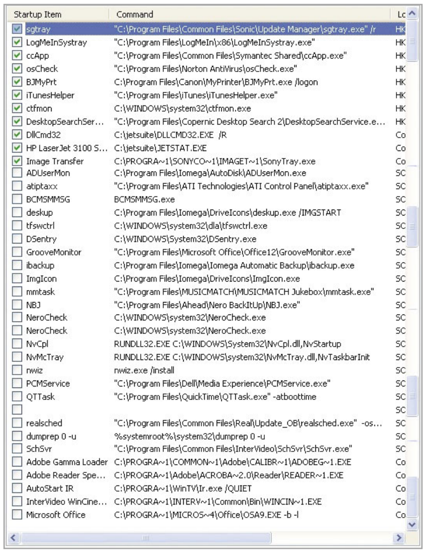
Some programs aren't that thoughtful, however, and you need to manually disable them. Fortunately, WinXP/Vista have a utility to manually disable startup programs called the System Configuration utility, commonly known as Msconfig. To start it in WinXP, click Start and then Run, type **msconfig** in the Run dialog box, and click OK. In Vista, just type **msconfig** in the Start Search field of the Start menu and press the ENTER key. When Msconfig opens, click the Startup tab and uncheck anything you don't want to start automatically. Click OK when finished and restart when prompted. You can re-enable any startup program by putting a check mark next to its entry again.

Windows Vista also comes with Windows Defender, which also has the ability to disable startup programs. To use it, choose Windows Defender from the Vista Start menu, then click the Tools icon in the Toolbar. Then click the Software Explorer link. Next, click the Show For All Users button at the bottom of the window. Finally, click any startup program in the list to select it and then click the Disable button. You can re-enable any startup program by selecting it from the list and clicking the Enable button. Note that Msconfig and the Software Explorer "share lists," so disabling something with Windows Defender simply removes it from the Msconfig list instead of unchecking it.

Finally, for power users (or holdouts still using Windows 2000, which doesn't come with Msconfig), you can't beat Microsoft's own free Autoruns, which is a free tool available at technet.microsoft.com/en-us/sysinternals/bb963902.aspx. Autoruns shows all the startup programs msconfig and Windows Defender can, plus it looks in a few more unconventional startup locations. It can review many other aspects of your system, too. You can also right-click a startup entry and choose Search Online from the pop-up menu, which does an MSN search on the Internet to identify any mysterious entries in the list. Click its Logon tab to see all the startup programs and remove the check mark next to any entry to disable it.

Startup Programs To Axe

Knowing how to kill startup programs can be child's play compared to knowing what startup programs to kill, but trust us, there's a lot of performance to be gained on a typical system by intelligently targeting startup programs to disable.



	Startup Item	Command	Lc
☑	sgtray	"C:\Program Files\Common Files\Sonic\Update Manager\sgtray.exe" /r	HK
☑	LogMeInSystray	"C:\Program Files\LogMeIn\x86\LogMeInSystray.exe"	HK
☑	ccApp	"C:\Program Files\Common Files\Symantec Shared\ccApp.exe"	HK
☑	osCheck	"C:\Program Files\Norton AntiVirus\osCheck.exe"	HK
☑	BJMyPrt	C:\Program Files\Canon\MyPrinter\BJMyPrt.exe /logon	HK
☑	iTunesHelper	"C:\Program Files\iTunes\iTunesHelper.exe"	HK
☑	ctfmon	C:\WINDOWS\system32\ctfmon.exe	HK
☑	DesktopSearchSer...	"C:\Program Files\Copernic Desktop Search 2\DesktopSearchService.e...	HK
☑	DllCmd32	C:\jetsuite\DLLCMD32.EXE /R	Co
☑	HP LaserJet 3100 S...	C:\jetsuite\JETSTAT.EXE	Co
☑	Image Transfer	C:\PROGRA~1\SONYCO~1\IMAGET~1\SonyTray.exe	Co
☐	ADUserMon	C:\Program Files\Iomega\AutoDisk\ADUserMon.exe	SC
☐	atiptaxx	"C:\Program Files\ATI Technologies\ATI Control Panel\atiptaxx.exe"	SC
☐	BCMSMMSG	BCMSMMSG.exe	SC
☐	deskup	C:\Program Files\Iomega\DriveIcons\deskup.exe /IMGSTART	SC
☐	tfswctrl	C:\WINDOWS\system32\dla\tfswctrl.exe	SC
☐	DSentry	C:\WINDOWS\System32\DSentry.exe	SC
☐	GrooveMonitor	"C:\Program Files\Microsoft Office\Office12\GrooveMonitor.exe"	SC
☐	ibackup	C:\Program Files\Iomega\Iomega Automatic Backup\ibackup.exe	SC
☐	ImgIcon	C:\Program Files\Iomega\DriveIcons\ImgIcon.exe	SC
☐	mmtask	"C:\Program Files\MUSICMATCH\MUSICMATCH Jukebox\mmtask.exe"	SC
☐	NBJ	"C:\Program Files\Ahead\Nero BackItUp\NBJ.exe"	SC
☐	NeroCheck	C:\WINDOWS\system32\NeroCheck.exe	SC
☐	NeroCheck	C:\WINDOWS\system32\NeroCheck.exe	SC
☐	NvCpl	RUNDLL32.EXE C:\WINDOWS\System32\NvCpl.dll,NvStartup	SC
☐	NvMcTray	RUNDLL32.EXE C:\WINDOWS\system32\NvMcTray.dll,NvTaskbarInit	SC
☐	nwiz	nwiz.exe /install	SC
☐	PCMService	"C:\Program Files\Dell\Media Experience\PCMService.exe"	SC
☐	QTTask	"C:\Program Files\QuickTime\QTTask.exe" -atboottime	SC
☐			SC
☐	realsched	"C:\Program Files\Common Files\Real\Update_OB\realsched.exe" -os...	SC
☐	dumprep 0 -u	%systemroot%\system32\dumprep 0 -u	SC
☐	SchSvr	"C:\Program Files\Common Files\InterVideo\SchSvr\SchSvr.exe"	SC
☐	Adobe Gamma Loader	C:\PROGRA~1\COMMON~1\Adobe\CALIBR~1\ADOBEG~1.EXE	Co
☐	Adobe Reader Spe...	C:\PROGRA~1\Adobe\ACROBA~2.0\Reader\READER~1.EXE	Co
☐	AutoStart IR	C:\PROGRA~1\WinTV\Ir.exe /QUIET	Co
☐	InterVideo WinCine...	C:\PROGRA~1\INTERV~1\Common\Bin\WINCIN~1.EXE	Co
☐	Microsoft Office	C:\PROGRA~1\MICROS~4\Office\OSA9.EXE -b -l	Co

Over time, every system is bound to pick up a few unnecessary startup applications. Pull the plug on those you don't need.

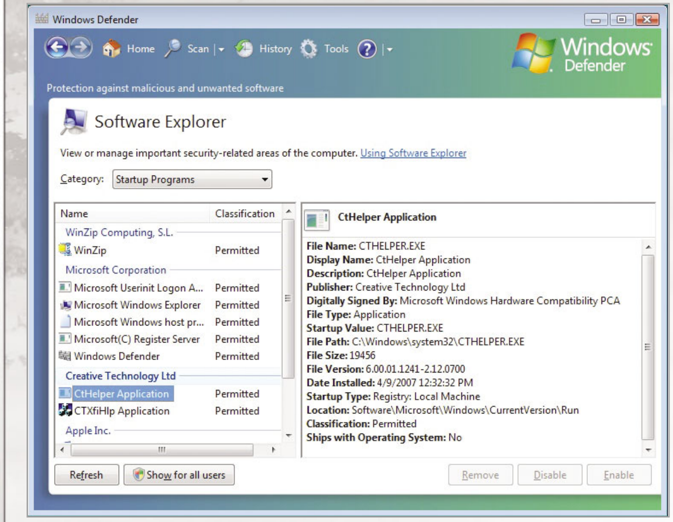
It's no secret that retail computers come preloaded with lots of unessential, performance-sapping bloatware, and older computers that have been in service for a year or two have a tendency to accumulate an almost unbelievable amount of startup programs. Above, we've stitched together a sequence of Msconfig screens from a 2-year-old Dell desktop, not only revealing those startup programs that you can safely disable to speed up a system but also illustrating just how many startup programs can attach themselves to a typical system over time. (By the way, this is a real screenshot from a real user's "home office" computer: We didn't add or remove any startup programs to make a point.)

In our typical computer, there are 37 entries, basically one for each startup program. And often, they are readily identified. (Identifying specific startup programs that use mysterious filenames is something we'll cover in the next section.) As you can see, after going through the list, only 11 are actually enabled, and they represent what's really essential for day-to-day operations for *this* user. Identifying your personal day-to-day operational requirements is the challenge. What might be required for you to work effectively may not be the same for other users. Still, there are guidelines to follow that make the process easier.

You generally need to leave the following types of startup programs enabled:

1. **Hardware support programs for regularly used equipment.** Some hardware requires both a driver (which you won't see on these lists) and a supporting program to feed it information or display its status. A good example of this is a printer status monitor, which displays ink levels in the Tray. Our example has two—one for an HP LaserJet 3100 and another for an unspecified Canon printer.

   If you own an iPod, anything related to iTunes, such as the iTunesHelper program, is generally needed to let the iPod automatically sync with iTunes. If you sync a handheld device every day, such as a Treo or PDA, its software (such as Palm's HotSync Manager) should remain enabled.
2. **Security software, such as antivirus, antispyware, or third-party firewall programs.** Our typical user has Norton AntiVirus installed for security duties, so anything running in a folder named Symantec or Norton is allowed to run. Disabling these programs generally disables the security application you've purchased. If you really don't want these to run, consider uninstalling the software entirely.
3. **Software you actually use regularly, if not daily.** If you actually use a certain software package almost every day and it genuinely requires a startup program, then it's worth the small hit in CPU and RAM usage to let it keep running. Examples in our typical system include the LogMeInSystray application (which allows remote access via the Internet), the Copernic Desktop Search indexer (which creates the searchable file index for desktop file searching), and Sony Image Transfer (which automatically downloads photos from a Sony digital camera and copies them to a specific folder on the hard drive). All these programs are used almost every day.
4. **Software that re-enables itself.** Ctfmon.exe is a helper application for Microsoft Office, which is installed on the typical



Software Explorer

View or manage important security-related areas of the computer. Using Software Explorer

Category: Startup Programs

Name	Classification
WinZip Computing, S.L.	
WinZip	Permitted
Microsoft Corporation	
Microsoft Userinit Logon A...	Permitted
Microsoft Windows Explorer	Permitted
Microsoft Windows host pr...	Permitted
Microsoft(C) Register Server	Permitted
Windows Defender	Permitted
Creative Technology Ltd	
CtHelper Application	Permitted
CTXfiHlp Application	Permitted
Apple Inc.	

CtHelper Application

File Name: CTHELPER.EXE
Display Name: CtHelper Application
Description: CtHelper Application
Publisher: Creative Technology Ltd
Digitally Signed By: Microsoft Windows Hardware Compatibility PCA
File Type: Application
Startup Value: CTHELPER.EXE
File Path: C:\Windows\system32\CTHELPER.EXE
File Size: 19456
File Version: 6.00.01.1241-2.12.0700
Date Installed: 4/9/2007 12:32:32 PM
Startup Type: Registry: Local Machine
Location: Software\Microsoft\Windows\CurrentVersion\Run
Classification: Permitted
Ships with Operating System: No

Vista's Software Explorer frequently provides details about startup programs, helping you make the decision which to cut.

system. When disabled, Office automatically re-enables it upon the next boot. If you have Office, Ctfmon.exe will keep coming back; there's no point in fighting it.

5. **Software that downloads updates for software you want immediately updated.** This system has Sgtray.exe, an automatic software updater for Sonic-branded products. This application downloads very frequent updates that the user wanted immediately. If you manually keep your applications updated, you can safely disable this category of programs.
6. **Software that performs essential automated tasks without user input.** Although there are no examples in this typical computer, things like automatic backup software or automatic drive defragmenters qualify. Likewise, if you have scheduling software running that isn't actively doing anything you consider worthwhile, disabling it is a good idea.

Basically, setting aside these types of programs as "worth keeping" essentially leaves everything else as "worth disabling," but regular usage counts, too, as you'll see. Generally, you can disable the following types of software:

1. **Infrequently used hardware's support programs, if they can be manually run when needed.** If you only sync your handheld device, such as a Palm Treo, once a month, then there's no need to constantly run the Palm HotSync Mananger. Instead, you can run it from the Start menu just before you actually sync your device.
2. **Software preloaders.** Some versions of Microsoft Office and Adobe Acrobat (among many others) try to "preload" themselves into memory, so that if you actually do use that software, it will start up in just five seconds instead of 10 or 15. However, if you only use that software once a week or less, it isn't really worth wasting RAM and CPU resources every day just to save five or 10 seconds once in a while. Just kill them and wait a few seconds more for that software, and all your other software will be happier for the extra resources.
3. **Support software for long-gone hardware.** Odds are that if you're like most users, when you replace your old hardware, you probably just unplug it and dispose/recycle/resell/donate it without ever thinking about it again. Ideally, you should uninstall any associated software. If that's not possible, then disabling any startup program that came with it is a good idea.

   For example, an old Zip drive installed ImgIcon.exe, Ibackup.exe, and Deskup.exe, none of which is needed now that the Zip drive is ancient history. Old video card support software is no longer needed after switching video cards, either, such as the NvCpl.dll and McMcTray.dll, since our typical user replaced an old Nvidia card with a newer ATI card.
4. **Infrequently (or never) used software support programs.** If iTunes has totally replaced MusicMatch Jukebox on your system, uninstalling it is a good idea. If you still occasionally use it, however, then disabling its helper program, such as Mmtask.exe, makes sense. In this case, GrooveMonitor is an example of software that installs automatically alongside Office 2007. If our typical power user never uses GrooveMonitor, he can disable it to save some resources.
5. **Automatic updaters for programs you can update manually or are rarely updated.** QuickBooks and Quicken are good examples of software that automatically checks for updates all the time. But unlike software such as antivirus software, for example, the actual updates for these programs only come once or twice a year, making the checker a waste of daily resources. On top of this, Intuit products, along with most products, have a Check For Updates command under the Help menu or About screen, so you can always check for updates yourself. In the typical system example, the RealPlayer's Realschedul.exe and InterVideo's SchSvr.exe are two such checkers that can be disabled.
6. **Third-party software that's not significantly better than what comes with Windows or other software.** Most wireless networking cards, be they integrated in a notebook or added later via USB or PCMCIA, come with hotspot connection manager software that replace the Wireless Network Connection utility that comes with Windows but really aren't any better. Disabling them and reverting to applications that are standard with Windows can save plenty of resources. Our sample Dell comes with software to automatically play a DVD movie when it's inserted, but our typical user watches DVDs with WinDVD. Dell Media Experience's PCMService.exe is disabled.

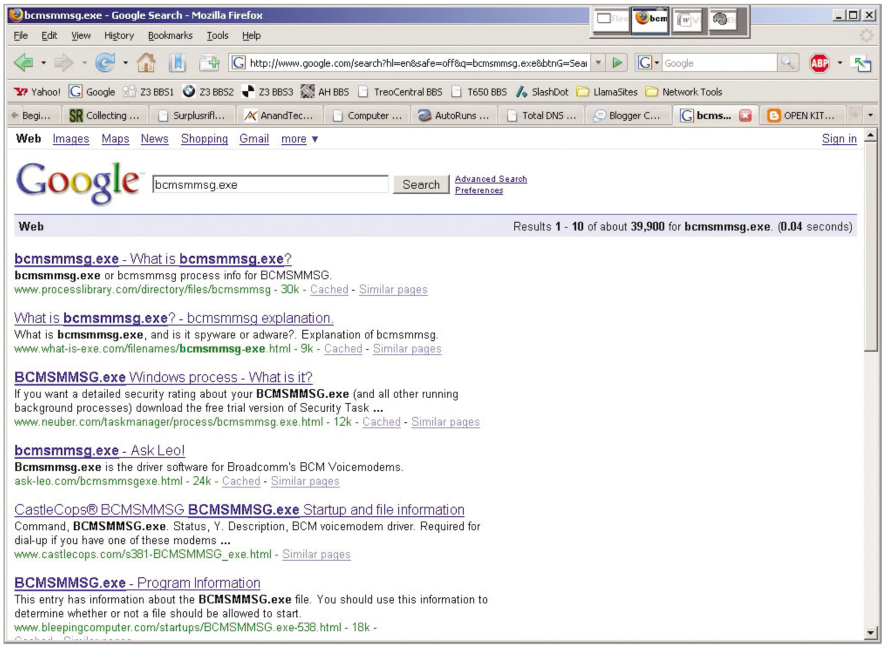
Identify Specific Startup Programs

It's not an exaggeration to say that there are tens of thousands of startup programs that could be on a system, and that's not counting any uniquely or randomly named pieces of malware. Thankfully, there are several ways to identify specific startup programs, and not all of them involve Google (though online searching is a valuable method).

The first way is to look at the startup lists provided by tools such as Msconfig. Look closely for clues in file/folder names and compare them to software that's already installed. For example, some executable files are clearly named, such as Nero Burning Rom's NeroCheck.exe or Microsoft Groove's GrooveMonitor.exe. Sometimes, the filenames might be cryptic but are stored in folders that are sensibly named, such as Mmtask.exe being located in a MUSICMATCH directory, or Reader~1.exe in an Adobe/Acrobat folder.

The second way is to use tools such as Vista's Software Explorer and Autoruns, which reduce a lot of the guesswork. Startup programs in Software Explorer are grouped by vendor by default, and clicking an entry displays a great deal of information about the startup program itself, such as the file's publisher, a description, its original date of installation, and if it is digitally signed. Autoruns includes a Publisher column for its listing. Most legitimate software displays information that can be trusted; it makes identifying startup programs a straightforward process.

A third way is to search for a cryptically named startup program on the Internet, but this requires a little bit of sleuthing. A good example to illustrate this technique is Bcmsmmsg.exe, which doesn't appear to be in a particular folder that can suggest its purpose. Also, its very name doesn't exactly ring any bells for any popular software, either. Fortunately, if you search Google for this file, the first six search results take you to Web pages that explain what this executable is. Because any Web page could be wrong, checking on a number of them for confirmation is a good idea. In this case, all six say that it is a software driver for a Broadcom-based dial-up modem. Naturally, you can disable this if you don't use (or even have) a dial-up modem.



Results **1** - **10** of about **39,900** for **bcmsmmsg.exe**. (**0.04** seconds)

bcmsmmsg.exe - What is **bcmsmmsg.exe**?
bcmsmmsg.exe or bcmsmmsg process info for BCMSMMSG.
www.processlibrary.com/directory/files/bcmsmmsg - 30k - Cached - Similar pages

What is **bcmsmmsg.exe**? - bcmsmmsg explanation.
What is **bcmsmmsg.exe**, and is it spyware or adware?. Explanation of bcmsmmsg.
www.what-is-exe.com/filenames/**bcmsmmsg-exe**.html - 9k - Cached - Similar pages

BCMSMMSG.exe Windows process - What is it?
If you want a detailed security rating about your **BCMSMMSG.exe** (and all other running background processes) download the free trial version of Security Task **...**
www.neuber.com/taskmanager/process/bcmsmmsg.exe.html - 12k - Cached - Similar pages

bcmsmmsg.exe - Ask Leo!
Bcmsmmsg.exe is the driver software for Broadcomm's BCM Voicemodems.
ask-leo.com/bcmsmmsgexe.html - 24k - Cached - Similar pages

CastleCops® BCMSMMSG **BCMSMMSG.exe** Startup and file information
Command, **BCMSMMSG.exe**. Status, Y. Description, BCM voicemodem driver. Required for dial-up if you have one of these modems **...**
www.castlecops.com/s381-BCMSMMSG_exe.html - Similar pages

BCMSMMSG.exe - Program Information
This entry has information about the **BCMSMMSG.exe** file. You should use this information to determine whether or not a file should be allowed to start.
www.bleepingcomputer.com/startups/BCMSMMSG.exe-538.html - 18k -

Google (and the Internet in general) can be your friend when ferreting out vaguely labeled startup apps as candidates for deletion.

Once you know what a program is, you can use the criteria listed to determine what should stay and what should go, disabling many unnecessary startup programs as a result. You'll probably be surprised how much better your computer runs and faster it boots afterwards.

Trade Eye Candy For Speed

Windows, especially Vista, can seem sluggish when the video setup isn't as powerful as Microsoft envisioned. If you can do without some of the visual polish, there are several ways to speed up Windows by reducing the level of GUI graphics.

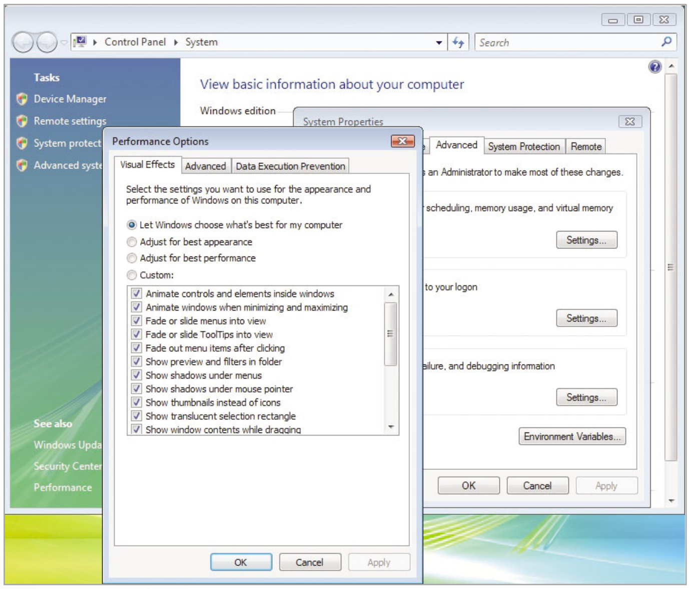
For Windows Vista, the first thing to do is eliminate the transparent glass effect for Desktop windows, which reduces the graphics hit on your video adapter but still allows for other Aero effects, such as Taskbar thumbnails and Flip 3D. To do this, right-click the desktop and choose Personalize, then click the Window Color And Appearance link in the new window that appears. Finally, uncheck the Enable Transparency option and click OK.

Windows Vista can also benefit from an old WinXP trick of disabling specific visual effects; there's a simple checklist that displays all sorts of effects that you can selectively enable and disable, and some make a big difference in speed. To access this list, right-click Computer (or My Computer) from the Start menu (or a Computer Desktop icon, if you have one) and choose Properties. In Vista, a second screen appears; click the Advanced System Settings link on the left. From the resulting System Properties window, click the Advanced tab and then click the Settings button in the Performance area of the screen. Disabling the Animate Windows When Minimizing And Maximizing checkbox offers a fairly dramatic increase of speed for Vista, but most of the other options also help speed up a slower computer or a notebook with an underpowered video display adapter.

Finally, if you're using Vista in a really underpowered machine, you can turn off Aero altogether. Right-click the Desktop and choose Properties from the pop-up menu. Click the Theme link, and from the resulting Theme Settings dialog box, choose the Windows Classic theme and click OK. In an instant, the GUI should be more responsive.

Windows Vista Speed Tweaks

Over the years, we've listed literally hundreds of WinXP speed tweaks. Now, we'll start the process for Windows Vista:



an Administrator to make most of these changes.

scheduling, memory usage, and virtual memory

to your logon

ailure, and debugging information

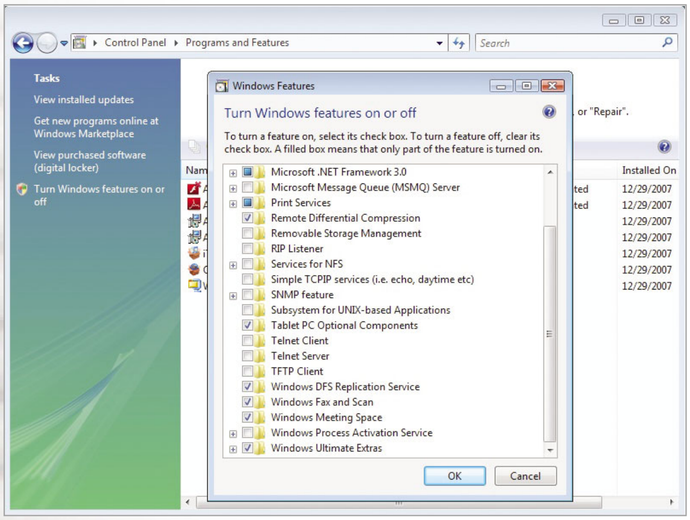
Select the settings you want to use for the appearance and performance of Windows on this computer.

● Let Windows choose what's best for my computer
○ Adjust for best appearance
○ Adjust for best performance
○ Custom:

☑ Animate controls and elements inside windows
☑ Animate windows when minimizing and maximizing
☑ Fade or slide menus into view
☑ Fade or slide ToolTips into view
☑ Fade out menu items after clicking
☑ Show preview and filters in folder
☑ Show shadows under menus
☑ Show shadows under mouse pointer
☑ Show thumbnails instead of icons
☑ Show translucent selection rectangle
☑ Show window contents while dragging

Translucent, 3D windows look slick but can bog down a system. A Spartan visual appearance will boost your UI performance.

- **Increase SATA drive performance.** Vista's write caching is fairly conservative by default in order to prevent data loss in the event of a power failure. If your desktop PC is connected to a UPS (uninterruptable power supply), or if you're using a notebook computer with a reliable battery, you can set the write caching to be more aggressive. Right-click Computer in the Start menu, choose Properties, and then click the Device Manager link. Expand the Disk Drives entry by clicking on the plus (+) symbol and then double-click your SATA hard drive. Click the Policies tab, check Enable Advanced Performance, and click OK. Rebooting Vista will enable this change.
- **Disable Network Printer Search.** Vista normally searches for new network printers when you browse your LAN, but if you aren't regularly adding printers to your network, this searching slows things down. To disable this feature, click Network from the Start menu, which opens the Network window. Press ALT to make the Menu Bar visible if it isn't already and then choose Folder Options from the Tools menu. Finally, click the View tab, uncheck Automatically Search For Network Printers, and then click OK.


Control Panel ▸ Programs and Features
Search
Tasks
View installed updates
Get new programs online at Windows Marketplace
View purchased software (digital locker)
Turn Windows features on or off
Nam
Installed On
Windows Features
Turn Windows features on or off
OK
Cancel

or "Repair".

12/29/2007
12/29/2007
12/29/2007
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12/29/2007
12/29/2007

To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.

- ▣ Microsoft .NET Framework 3.0
- ☐ Microsoft Message Queue (MSMQ) Server
- ▣ Print Services
- ☑ Remote Differential Compression
- ☐ Removable Storage Management
- ☐ RIP Listener
- ☐ Services for NFS
- ☐ Simple TCPIP services (i.e. echo, daytime etc)
- ☐ SNMP feature
- ☐ Subsystem for UNIX-based Applications
- ☑ Tablet PC Optional Components
- ☐ Telnet Client
- ☐ Telnet Server
- ☐ TFTP Client
- ☑ Windows DFS Replication Service
- ☑ Windows Fax and Scan
- ☑ Windows Meeting Space
- ☐ Windows Process Activation Service
- ☑ Windows Ultimate Extras

Vista's packed with services, but you should disable what you'll never use.

- **Increase external USB hard drive performance.** By default, USB storage devices have write caching totally disabled, primarily so you can unplug them without bothering with the Safely Remove Software icon in the Tray. Although this is handy for flash drives, it significantly slows down external USB hard drives. First, plug in your external USB drive, right-click Computer in the Start menu, and choose Properties. Then, click the Device Manager link, expand the Disk Drives entry by clicking the plus (+) sign, and double-click your external USB hard drive. Click the Policies tab and then click Optimize For Performance. This makes two more options appear: Enable Write Caching On The Disk and Enabled Advance Performance. Enable both options and click OK. Rebooting enables the change.
- **Turn unneeded Vista features off.** Windows Vista adds hundreds of features when it is installed. Not all of them are enabled by default, but you probably don't need many that are, anyway. Disabling those you don't need saves resources and speeds your system up. To find these and disable them, open the Windows Control Panel and switch to Classic View. Next, double-click the Programs And Features icon and then click the Turn Windows Features On Or Off link on the left side of the window. After a moment, a large list appears with checkboxes. Those that are checked are enabled and those that aren't are disabled. Different versions of Vista have different features enabled, so expand any collapsible entries by clicking the plus (+) sign to see what's turned on and disable what you don't need. For example, if you don't have a Tablet PC, you can safely disable Tablet PC Options Components. Click OK when you're done, and your computer will restart if necessary.
- **Turn unneeded Vista services off.** This is an old trick we used for WinXP, and it's still possible, although not quite as convenient, with Vista. WinXP let you create Hardware Profiles. At boot time, it would present a list of all the Hardware Profiles you configured. You could associate different background

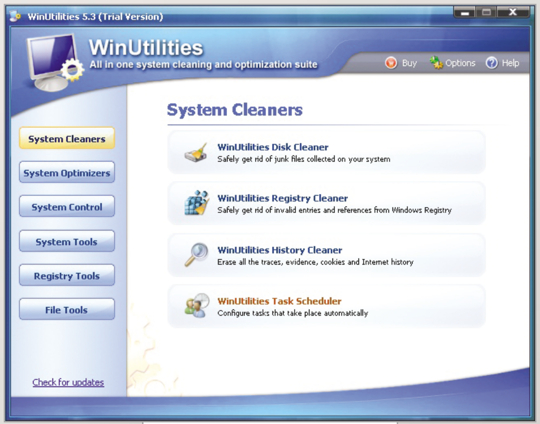
services with different profiles, allowing for a slim roster of services for gaming and video rendering but a full roster for normal computing.

Vista still lets you remove unneeded services, but you can't associate them with a hardware profile. There are dozens of services running on a normal Vista system, and each one has a purpose that you may not need. The best list of Vista services we've found, including both their purposes and dependencies, remains at BlackViper (www.blackviper.com/WinVista/servicecfg.htm). To disable unwanted services in Vista, open the Start menu, type **services.msc** in the Start Search field, and press ENTER. Right-click a service in the list and choose Properties. Change the Startup Type menu to Manual to disable a service and reboot the computer for the changes to take effect. △

by Warren Ernst

Windows Optimizer Applications

For as long we've had Windows, there have been Windows optimization programs to try and clean it up and make it work better. We looked at two of the best Windows Optimizers—one commercial and one freebie (although donations are accepted).


WinUtilities 5.3 (Trial Version)
WinUtilities
All in one system cleaning and optimization suite
Buy
Options
Help
System Cleaners
System Cleaners
System Optimizers
System Control
System Tools
Registry Tools
File Tools
Check for updates
WinUtilities Disk Cleaner
Safely get rid of junk files collected on your system
WinUtilities Registry Cleaner
Safely get rid of invalid entries and references from Windows Registry
WinUtilities History Cleaner
Erase all the traces, evidence, cookies and Internet history
WinUtilities Task Scheduler
Configure tasks that take place automatically

WinUtilities 5.3
$39.99
L Computing
www.ylcomputing.com
●●●

L Computing WinUtilities 5.3

WinUtilities is a comprehensive utility toolbox that possesses a broad set of Windows optimizers and cleanup tools. You could probably go online and find about a dozen small freeware utilities that duplicate much of WinUtilities' functionality, but they would lack the smooth integration and smart help system that WinUtilities brings to the table.

The cleanup tools include a junk file cleaner (which only found junk files on our test system), a Registry checker and cleaner (which found 142 errors—mostly "missing or invalid path" errors), a duplicate file finder (which found four sets of dupes), a Shortcut fixer, and a browser/Explorer History cleaner, which works as advertised. These fixes managed to change our boot time from 31 seconds to, well, 30.5 seconds, which isn't a huge improvement compared to the other tips in this article that can shave *minutes* off a boot time in some cases. The Memory Optimizer attempts to free up RAM on-demand, usually by shoving infrequently used software in memory to the Swap file. It manages to do this, but any speed increases to be gained this way are quickly lost as new programs take up that memory again. It is useful for clearing out RAM for a hardcore computer game in lieu of a reboot, however.

There are too many other utilities to list, but handy ones include a background process monitor, software uninstallation manager, file shredder, file splitter, dashboard for most of Windows' own utilities that are normally scattered across the system, and a startup program cleaner that's much more functional than Msconfig.

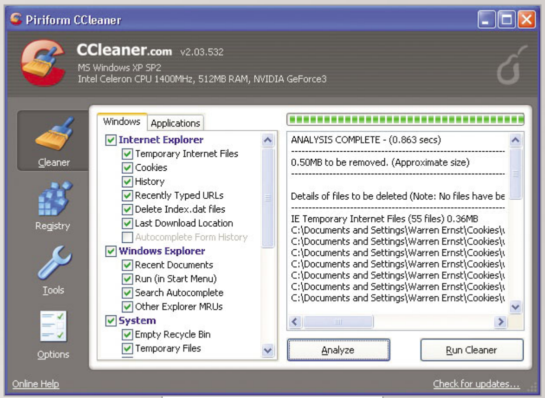
Though a handy suite of utilities to have, WinUtilities did little to increase our system's overall speed.

Piriform CCleaner 2.03

CCleaner lacks WinUtilities' "jack of all trades" philosophy, opting only for cleaning all the "crud" from your system and clearing out the Registry. Its long history of not messing up systems and its low, low price (of free) make it very popular among the tech-set.

By default, CCleaner is fairly conservative, but there are significant gains to be had by telling it to be more aggressive. By default, the general "crud cleaner" found literally hundreds of files to delete, such as browser histories, cookies, and temp files; Windows log files and temporary files; and the temp files from many popular applications such as Acrobat, Office, Nero, WinZip, and Google Toolbar. The Registry cleaner found just 33 items to clean. When set more aggressively, CCleaner removes old Prefetch data, Tray and Start menu cache, User Assist history, and any Windows Hotfix uninstallers. These new settings removed 233MB of files from what we generally consider to be a fairly lean system. CCleaner also has a very basic uninstaller and startup program remover, but both are primitive compared to Windows' own tools.

Boot times decreased from 31 seconds to 29 seconds after running CCleaner on its aggressive settings, meaning it did a slightly better job than WinUtilities at making our system run faster. But this too was a fairly trivial improvement. It does excel at removing personal traces of your browsing history, however, and is worth using for this feature alone. △



```
ANALYSIS COMPLETE - (0.863 secs)
------------------------------------------------
0.50MB to be removed. (Approximate size)
------------------------------------------------

Details of files to be deleted (Note: No files have be
------------------------------------------------
IE Temporary Internet Files (55 files) 0.36MB
C:\Documents and Settings\Warren Ernst\Cookies\
C:\Documents and Settings\Warren Ernst\Cookies\
C:\Documents and Settings\Warren Ernst\Cookies\
C:\Documents and Settings\Warren Ernst\Cookies\
C:\Documents and Settings\Warren Ernst\Cookies\
C:\Documents and Settings\Warren Ernst\Cookies\
C:\Documents and Settings\Warren Ernst\Cookies\
```

CCleaner 2.03
Free
Piriform
www.ccleaner.com
●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

BIOS CHICANERY

PRESS DELETE TO VICTORY

We're always publishing performance-related articles here in the pages of *CPU*, a significant portion of which have focused on overclocking via the system BIOS. After all, overclocking is a quick (and usually easy) way to take a system's performance up to the next level. But there is a multitude of other ways to unlock even more performance from your PC via the system BIOS, and none of them have anything to do with overclocking.

We should note, however, that "more performance" doesn't necessarily mean higher benchmark scores. If two systems with identical hardware configurations take 45 and 35 seconds to boot into Windows, respectively, shouldn't the one with the shorter boot time be considered the better-performing system? A couple of the BIOS modifications we're going to describe for you have an effect on key performance-related aspects of a system, like available memory, for example, but they won't all boost your 3DMark score or frame rates. Just something to keep in mind should you decide to take our advice.

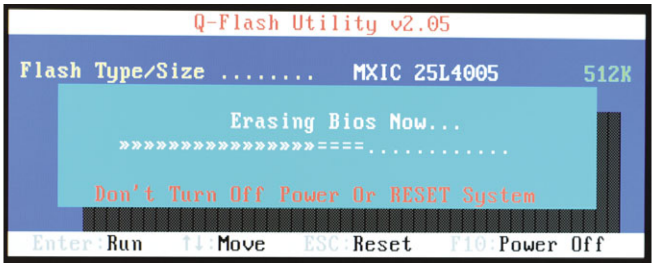
Flash The BIOS

Before we cover the actual BIOS modifications, we wanted to talk a bit about flashing a system BIOS. Flashing a BIOS is actually a divisive topic in IT circles. In one camp, there are those that feel users should never flash their BIOS to a newer version unless they are having a specific problem that the new BIOS addresses. In the other camp are those that think keeping a system up-to-date with the latest BIOS is good idea, because new BIOS revisions typically include bug fixes, support for newer hardware, and sometimes new features. We suspect many of you, as power users, fall into the latter category.

With the current crop of motherboards, updating a BIOS has never been easier. The old, tried-and-true method of using a bootable floppy with the necessary flashing utility and ROM file still works, and a number of Windows-based flash utilities are available, too. But many modern motherboards actually incorporate the flash utility into their BIOS menus and can work with all different types of media. Typically, you'd copy the BIOS update to a thumb drive or floppy diskette, power up the system, enter the BIOS, and choose the option to update (sometimes known as EZ-Flash or Q-Flash). Follow the on-screen instructions and you're done.

Memory Latency Tweaking

An easy way to increase performance via the BIOS is to configure system memory to operate at lower latencies. This is different



```
                Q-Flash Utility v2.05
 Flash Type/Size ........    MXIC 25L4005          512K
                  Erasing Bios Now...
            »»»»»»»»»»»»»»»»»»»»====............
           Don't Turn Off Power Or RESET System
   Enter:Run    ↑↓:Move    ESC:Reset    F10:Power Off
```

Flash a motherboard's BIOS to incorporate compatibility updates and bug fixes.

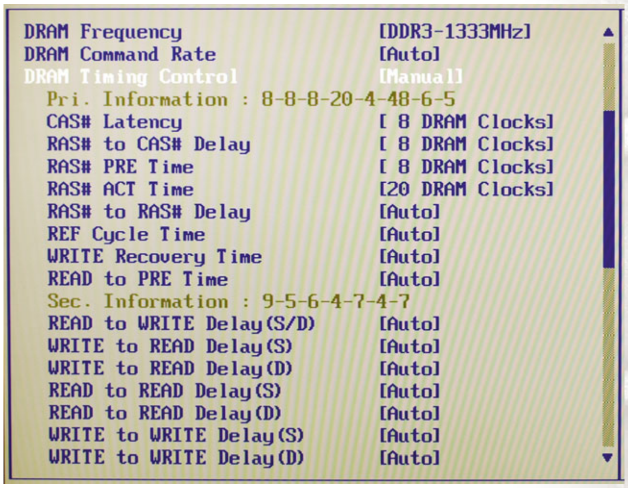
than overclocking memory to increase its frequency. Instead, by lowering memory latencies—also known as tightening the timings—you decrease the number of clock ticks it takes the memory and memory controller to perform certain operations.

Like overclocking, lowering memory latency settings to levels below what is officially supported by a memory kit will not always work; it takes some finessing. But, with a little extra voltage and good-quality RAM, it's usually possible. The pertinent settings will typically be located in the Advanced Chipset section of the system BIOS, or in the section dedicated to overclocking. The memory timing options that will have the most pronounced affect on performance will usually be labeled CAS Latency, tRCD (RAS to CAS Delay), and tRP (Row Precharge).

If your memory is rated for operation at CAS 5-5-5, that means it has a CAS Latency of 5, a tRCD of 5, and a tRP of 5. Try lowering each one of these settings, one at a time, and then testing for stability and increased performance. Sometimes you'll find that you can lower all three settings without any issues; other times, only one or two of them can be changed, and you'll need to increase your memory's voltage to do it.

We ran a few tests using a DDR3-1333 memory kit rated for operation at CAS 8-8-8 at 1.8V on a Core 2 Extreme QX6850-powered system. Without increasing the voltage, we found that the memory had no trouble operating at CAS 7-7-7. And with an increase to 1.95V, the same kit operated at CAS 6-6-6.

To illustrate the kind of impact tightening the timings on the RAM had on the system, we ran a few benchmarks using SiSoft SANDRA. According to the benchmarks, as we lowered the CAS latency, the available memory bandwidth increased, and, of course, memory latency decreased—two things that are sure to enhance system performance. Higher bandwidth and lower latencies mean more data can be transferred to and from the memory more quickly.



```
DRAM Frequency                          [DDR3-1333MHz]
DRAM Command Rate                       [Auto]
DRAM Timing Control                     [Manual]
  Pri. Information : 8-8-8-20-4-48-6-5
  CAS# Latency                          [ 8 DRAM Clocks]
  RAS# to CAS# Delay                    [ 8 DRAM Clocks]
  RAS# PRE Time                         [ 8 DRAM Clocks]
  RAS# ACT Time                         [20 DRAM Clocks]
  RAS# to RAS# Delay                    [Auto]
  REF Cycle Time                        [Auto]
  WRITE Recovery Time                   [Auto]
  READ to PRE Time                      [Auto]
  Sec. Information : 9-5-6-4-7-4-7
  READ to WRITE Delay(S/D)              [Auto]
  WRITE to READ Delay(S)                [Auto]
  WRITE to READ Delay(D)                [Auto]
  READ to READ Delay(S)                 [Auto]
  READ to READ Delay(D)                 [Auto]
  WRITE to WRITE Delay(S)               [Auto]
  WRITE to WRITE Delay(D)               [Auto]
```

Lowering memory latency settings via the system BIOS will result in higher performance in many applications. Just make sure the memory can support the tighter timings, or the system will be unstable (if it boots at all).

Unganged vs. Ganged Modes

Like the older Athlon 64, AMD's relatively new Phenom processors have an integrated memory controller. But AMD enhanced Phenom's memory controller to offer a new mode of operation. With Athlon 64 processors, when running a dual-channel RAM configuration, the memory controller operates as a single device with a 128-bit interface (64 bits per DIMM channel). This is called ganged mode. Phenom processors offer a new unganged mode, which lets the memory controller operate as two independent 64-bit controllers when a pair of DIMMs is installed. Unganged mode gives Phenom systems the ability to read and write to memory simultaneously over the two channels, which can have a marked affect on performance, particularly with multithreaded applications or when multiple applications are running at the same time.

SiSoft SANDRA XII SP1	CAS 8-8-8	CAS 7-7-7	CAS 6-6-6
RAM Bandwidth Int. iSSE2 (MBps)	6,576	6,619	6,739
RAM Bandwidth Float iSSE2 (MBps)	6,571	6,649	6,810
Memory Latency	79ns	75ns	73ns

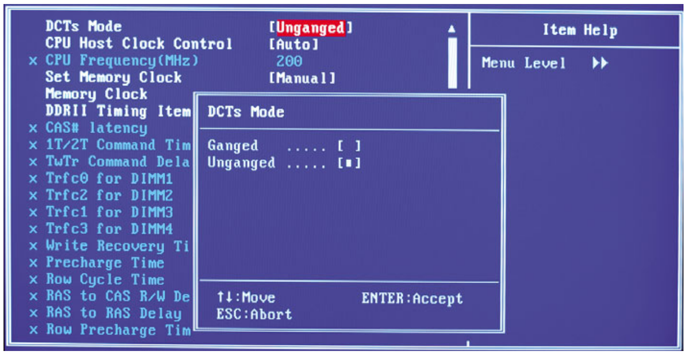
SiSoft SANDRA XII SP1	Ganged Mode	Unganged Mode
RAM Bandwidth Int. iSSE2 (MBps)	9,091	10,524
RAM Bandwidth Float iSSE2 (MBps)	9,078	10,546
Memory Latency	88ns	90ns

To enable unganged mode, access the Advanced Chipset section of the system BIOS (or the section dedicated to overclocking and DRAM configuration, depending on the motherboard). Find the option for DCTs (DRAM controllers) and change it to Unganged.

With a Phenom 9600 processor and 2GB of DDR2-1066 RAM installed into an AMD 790FX chipset-based motherboard, we reran the SiSoft SANDRA memory bandwidth and latency tests to show you the performance effect while running the integrated memory controller in unganged mode. According to the tests, peak memory bandwidth increased by almost 1.5GBps. Latency, however, climbed higher. (However, you'd only notice the higher latency in programs significantly affected by memory latency.)

Nix Unused Peripherals

Most of today's motherboards, especially high-end models targeted at power users, have numerous integrated peripherals and secondary controllers. Although these integrated peripherals add features to the motherboards, they also consume resources when enabled, even if they are not being used. Take the Intel X38-based Asus P5E3 Deluxe, for example. The P5E3 Deluxe features an integrated JMicron SATA/PATA controller, integrated Wi-Fi and FireWire, dual Gigabit Ethernet controllers, a serial port, and HD audio. By default, all of these integrated peripherals are enabled in the system



```
   DCTs Mode                        [Unganged]          ▲ |      Item Help
   CPU Host Clock Control           [Auto]                |
 × CPU Frequency(MHz)                200                  | Menu Level   ▶▶
   Set Memory Clock                 [Manual]              |
   Memory Clock
   DDRII Timing Item | DCTs Mode
 × CAS# latency      |
 × 1T/2T Command Tim | Ganged    ..... [ ]
 × TwTr Command Dela | Unganged  ..... [■]
 × Trfc0 for DIMM1   |
 × Trfc2 for DIMM2   |
 × Trfc1 for DIMM3   |
 × Trfc3 for DIMM4   |
 × Write Recovery Ti |
 × Precharge Time    |
 × Row Cycle Time    |
 × RAS to CAS R/W De |  ↑↓:Move            ENTER:Accept
 × RAS to RAS Delay  |  ESC:Abort
 × Row Precharge Tim
```

AMD's new Phenom processor line can operate with its integrated memory controller in a new unganged mode that allows for simultaneous reads and writes.

BIOS, which means that each one requires memory address space and drivers.

If you have a motherboard with numerous integrated peripherals that you don't use frequently, disabling them via the system BIOS can free up memory and speed boot times. To disable the devices, enter the BIOS and navigate to the Integrated Peripherals menu. In the Integrated Peripherals menu, you will see all of the onboard devices listed. Simply highlight the items you don't use and disable them.

Using the same Asus P5E3 Deluxe motherboard mentioned here, we ran a simple test with Windows Vista Ultimate. In the first test, we left all of the motherboard's integrated peripherals enabled. In the second, we disabled them all except for the HD audio controller and a single Gigabit Ethernet controller. With all of these devices enabled, Windows Vista reported our system using 596MB of physical memory when it was idling. Disabling the devices via the system BIOS, however, resulted in only 568MB of used physical memory, a

BIOS Modification Utilities: An Easier Way to Tweak Performance?

Most major chipset and motherboard manufacturers have introduced Windows-based applications that give users the ability to access low-level settings that have historically only been available via the system BIOS. These applications work hand in hand with the BIOS but require special hooks to be able to alter settings on the fly, so they are not universally compatible. These applications let users overclock their processors and memory, tweak voltages and fan speeds, and, in some cases, adjust CPU multipliers.

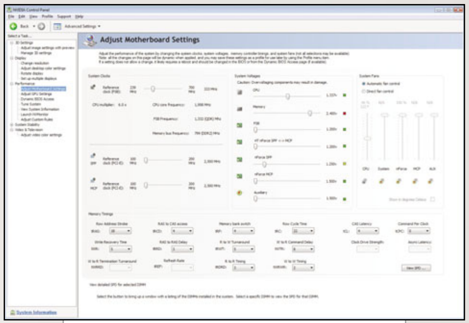
Intel, AMD, and Nvidia have all introduced Windows-based BIOS modification and hardware-monitoring utilities, as have a number of large motherboard manufacturers, such Gigabyte and Asus. Each of these applications has different capabilities and fortes, but they all perform similar functions. We've rounded up a few of them to see which ones make the cut.

Nvidia nTune Performance Application

Nvidia's nTune Performance Application began its life a number of years ago as the Nvidia System Utility. Over time, and a few revisions later, Nvidia thought up a new name and incorporated a multitude of useful features. The nTune Performance Application let you alter system clock frequencies, fan speeds, and numerous voltages using simple sliders. You can also tweak memory timings using clearly labeled drop-down menus.

The nTune Performance Application also gives you the ability to monitor system temperatures, test for stability, and set custom profiles that adjust certain system settings when you run different programs. For example, one profile can be configured to lower clock and fan speeds for near-silent operation, while another increases voltages and clock speeds for maximum performance.

We found nTune to be straightforward and easy to use. We should note that nTune currently supports Windows XP/Vista and works with all nForce chipsets from the nForce 220 to the 780i SLI. However, to be compatible with nTune, a motherboard must have the necessary BIOS hooks, and not every nForce motherboard has the necessary hooks. Check with your motherboard manufacturer to see if it supports nTune.



nTune Performance Application

Nvidia

www.nvidia.com

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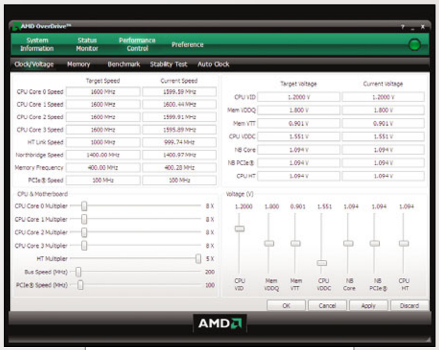
AMD OverDrive

To coincide with the launch of its Spider platform, AMD announced a new system-tweaking utility dubbed OverDrive. OverDrive was still in beta at press time, but the application is already jammed with features and quite powerful.

On the surface, OverDrive is much like nTune. Both applications give users the ability to alter system clock



	Target Speed	Current Speed
CPU Core 0 Speed	1600 MHz	1599.59 MHz
CPU Core 1 Speed	1600 MHz	1600.44 MHz
CPU Core 2 Speed	1600 MHz	1599.91 MHz
CPU Core 3 Speed	1600 MHz	1595.89 MHz
HT Link Speed	1000 MHz	999.74 MHz
Northbridge Speed	1400.00 MHz	1400.97 MHz
Memory Frequency	400.00 MHz	400.28 MHz
PCIe® Speed	100 MHz	100 MHz

	Target Voltage	Current Voltage
CPU VID	1.2000 V	1.2000 V
Mem VDDQ	1.800 V	1.800 V
Mem VTT	0.901 V	0.901 V
CPU VDDC	1.551 V	1.551 V
NB Core	1.094 V	1.094 V
NB PCIe®	1.094 V	1.094 V
CPU HT	1.094 V	1.094 V

CPU & Motherboard
CPU Core 0 Multiplier 8 X
CPU Core 1 Multiplier 8 X
CPU Core 2 Multiplier 8 X
CPU Core 3 Multiplier 8 X
HT Multiplier 5 X
Bus Speed (MHz) 200
PCIe® Speed (MHz) 100

Voltage (V)
CPU VID 1.2000
Mem VDDQ 1.800
Mem VTT 0.901
CPU VDDC 1.551
NB Core 1.094
NB PCIe® 1.094
CPU HT 1.094

OverDrive

AMD

www.amd.com

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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

savings of almost 30MB. 30MB may not seem like a lot in this day of 4GB-plus memory configurations, but increasing available memory is a great way to increase overall performance We'll take every megabyte we can get.

Streamline The Boot Process

Another way to speed up a system via the BIOS is to change its boot order. Typically, a motherboard will attempt to boot from a removable device, such as a floppy drive, first, then to an optical drive, and finally the hard drive. If you know you won't be using the floppy or optical drive, why not have the system look to the hard drive first and save some time?

Enter the system BIOS and navigate to the Boot menu. On the Boot menu, you should see a list of items labeled First (or 1st) Boot Device, Second Boot Device, etc. Select the First Boot Device option and change it to the system's primary hard drive. With the hard drive first in the boot order, the motherboard will immediately look to the hard drive to boot.

To see how changing the boot order affected our system's boot time in a system equipped with a floppy drive, a pair of optical drives, and a hard drive, we timed how long it took for the system to boot from a powered-off state until the Windows Desktop appeared and the spinning activity indicator was gone. With the hard drive last in the boot order and all the motherboard's integrated peripherals enabled, our system booted in 46.1 seconds. By disabling the unused peripherals and setting the hard drive as the first boot devices, the system booted in 35.6 seconds, shaving a full 10.5 seconds off the total boot time.

There are many more options within the system BIOS that can affect performance in similar ways to the mods we've shown you here. They may not turn a midrange rig into a high-end dream machine, but every little bit of performance helps. And it's especially nice when you can get that performance for free. △

by Marco Chiappetta

frequencies, fan speeds, and memory timings, and both can be used to monitor PC health. But OverDrive pulls away from nTune in regard to its CPU tweaking options and built-in stability tests. With OverDrive, users can tweak the multipliers on the individual Phenom cores and run each core at different clock speeds. And the stability tests work multiple parts of a system to ensure overclocked settings are truly stable.

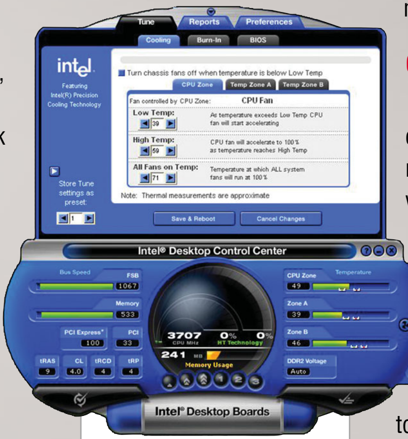
OverDrive's only weakness is it's freshness: It's currently only compatible with AMD 7-Series motherboards running WinXP/Vista.

Intel Desktop Control Center

There was a time when Intel wouldn't even consider talking about overclocking, but now the company seems to actually encourage it with its Desktop Control Center. The Intel Desktop Control Center application is available for only a select few Extreme series motherboards. The most current revision, 4.0, is still in the beta phase (3.0 is the current stable version) and supports the new DX38BT motherboard (and presumably the upcoming DX48BT). Previous revisions of the application support motherboards dating back to the D865PERL, however.

Like AMD's and Nvidia's offerings, the Intel Desktop Control Center application has a full suite of tools for altering system clocks, modifying memory timings, and monitoring key voltages and fan speeds, but the options aren't quite as extensive. We also thought the interface was somewhat more cramped.

Ultimately, Intel's Desktop Control Center application is a fine piece of software that works well on the few Intel-built motherboards it supports. But competing products offer more features for enthusiasts who like to tinker.



☐ Turn chassis fans off when temperature is below Low Temp

Fan controlled by CPU Zone: CPU Fan

Low Temp: 39 — As temperature exceeds Low Temp CPU fan will start accelerating

High Temp: 59 — CPU fan will accelerate to 100% as temperature reaches High Temp

All Fans on Temp: 71 — Temperature at which ALL system fans will run at 100%

Note: Thermal measurements are approximate

FSB 1067
Memory 533
PCI Express* 100
PCI 33
tRAS 9
CL 4.0
tRCD 4
tRP 4
3707 CPU MHz
0% 0% HT Technology
241 MB Memory Usage
CPU Zone 49
Zone A 39
Zone B 46
DDR2 Voltage Auto
CPU ● Auto ○ Manual 2003
System ● Auto ○ Manual
Fan 1 1918
Fan 2 2712
Fan 3 6593

Desktop Control Center
Intel
www.intel.com
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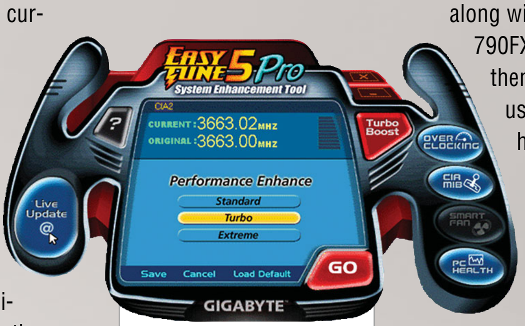
Gigabyte Easy Tune 5 Pro

Gigabyte's Easy Tune 5 Pro application is included with a variety of the company's high-end motherboards. Much like the other applications we've featured here, Easy Tune 5 Pro lets users modify a number of key settings to overclock a system and increase performance. It also has a number of tools available for monitoring PC health and fan speeds. Unfortunately, the application is hampered by a cartoonish interface and iffy compatibility.

We initially tried to take Easy Tune 5 Pro for a test drive on Gigabyte's GA-MA790FX-DQ6 motherboard, only to be greeted by a lovely BSOD upon rebooting the system after installation—not a good sign. We tried multiple versions of the application along with different chipset drivers with the 790FX-based board without success. We then gave the program another chance using a GA-X38-DQ6 motherboard and had better luck.

We found that Easy Tune 5 Pro was fairly easy to use and think its easy and advanced modes of operation have some merit. Easy allows for rudimentary overclocking using percentages, while advanced mode allows for manual bus and voltage speed modifications. In the end, though, questionable compatibility and an undesirable interface left us wanting to tweak performance the old-fashioned way. △



CIA2
CURRENT: 3663.02 MHZ
ORIGINAL: 3663.00 MHZ

Performance Enhance: Standard / Turbo / Extreme

Easy Tune 5 Pro
Gigabyte
www.giga-byte.com
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

SOFTCORE MODS

TUNE YOUR SYSTEM TO COOK WITHOUT COOKING YOUR SYSTEM

Obsession with hardware and software performance is what separates the power users from the rest of the crowd. The truly hardcore among us overclock everything they can get their hands on to boost performance, but there are other options if you want to keep your hardware and your warranties intact. Whether it's as simple as changing a single setting or as complicated as ripping out the old hardware and installing something newer, there's usually a way to boost hardware performance without resorting to overclocking.

Before you begin, don't forget that high performance equals heat, so make sure there is good airflow throughout the case. Big fans that operate at relatively low rpm are preferable to smaller fans that operate at relatively high rpm, in terms of both efficiency and noise. Swapping out generic cables and interconnects for rounded versions and routing them out of the way using simple plastic zip ties is an inexpensive way to improve airflow and is particularly effective if any of your drives use IDE cables. Finally, make sure the case is sealed. It may seem like leaving a side panel off would let more air into and out of the case, but doing so actually robs the fans of much of their efficiency while opening all of your expensive components up to dust and other contaminants.

Basic Benchmarking

It's surprising how much you can learn simply using Windows' built-in Performance Monitor, so we'll start there, using the one included with Vista Ultimate. You can also look at the "Digging Deeper" sidebar for information about third-party monitoring and benchmarking tools.

In Classic View, click Start, then Control Panel, and double-click Performance Information And Tools. If you want a quick-and-dirty benchmark, click Update My Score and wait for the test to complete. The numbers it generates aren't of much concern in and of themselves, but a particularly low score in one or more areas will identify the components of your PC you'll want to concentrate on throughout this article.

Click Advanced Tools and take care of any entries in the Performance Issues area (assuming there are any). Our concern is hardware, however, so click Open Reliability And Performance Monitor. Click Performance Monitor and the green plus (+) button, and a list of counters appears. There are dozens of counters here that will help you monitor system performance and health, but some are more important than others for identifying slow hardware.

In the Processor section, add % Processor Time if you have a single-core CPU or % Total Processor Time if you have a multicore

CPU. Values consistently over 80% (spikes are permissible) indicate that the CPU is struggling even when you aren't actively working on anything; you may need to check BIOS settings (to make sure multiple cores are enabled, for example) or upgrade the CPU.

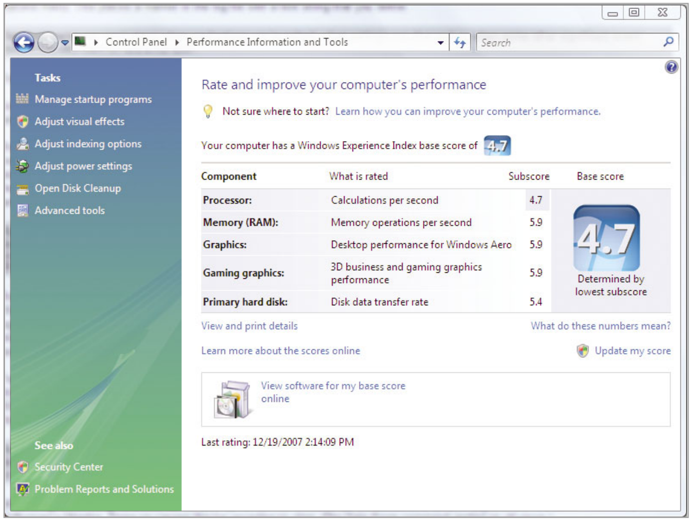
Expand PhysicalDisk and add % Disk Time. Consistently high percentages here may indicate a hard drive bottleneck. You can also click Reliability And Performance and watch the Disk graph. Consistently high values here indicate a bottleneck, often caused by RAM starvation.

That leads us to the system memory. In this category, it's easiest to click Reliability And Performance and expand the Memory section. Click Hard Faults to sort the list from the greatest to the least number of hard page faults. Hard page faults aren't errors, but they do indicate that your system is using virtual memory instead of system memory. Consistently high numbers here can mean the memory is failing and needs to be replaced, but most often it means there isn't enough memory installed, forcing your system to use virtual memory to fill the gap.

You can verify these Performance Monitor findings using the tools listed in the sidebar. Read on for specific tweaks that can help stave off these unwanted performance problems.

CPU Tweaks

If you have a multicore CPU that seems to be lagging, check the BIOS to make sure all the cores are enabled. Beyond that, the best thing you can do to enhance performance aside from overclocking is swapping the CPU out for a faster model. Use CPU-Z (Free; www.cpuid.com) to determine what type of motherboard you have to determine the various types of CPUs it supports. If it can use a faster one, or even a CPU that is the same speed or slower but uses better technology (for example, more cores and a larger cache), think about upgrading. If not, you'll need to upgrade the motherboard and the CPU to get a performance boost in this area. CPU-Z is also perfect for obtaining info about RAM, so it'll come in handy later.



Rate and improve your computer's performance

Not sure where to start? Learn how you can improve your computer's performance.

Your computer has a Windows Experience Index base score of 4.7

Component	What is rated	Subscore	Base score
Processor:	Calculations per second	4.7	4.7 Determined by lowest subscore
Memory (RAM):	Memory operations per second	5.9	
Graphics:	Desktop performance for Windows Aero	5.9	
Gaming graphics:	3D business and gaming graphics performance	5.9	
Primary hard disk:	Disk data transfer rate	5.4	

View and print details

What do these numbers mean?

Learn more about the scores online

Update my score

View software for my base score online

Last rating: 12/19/2007 2:14:09 PM

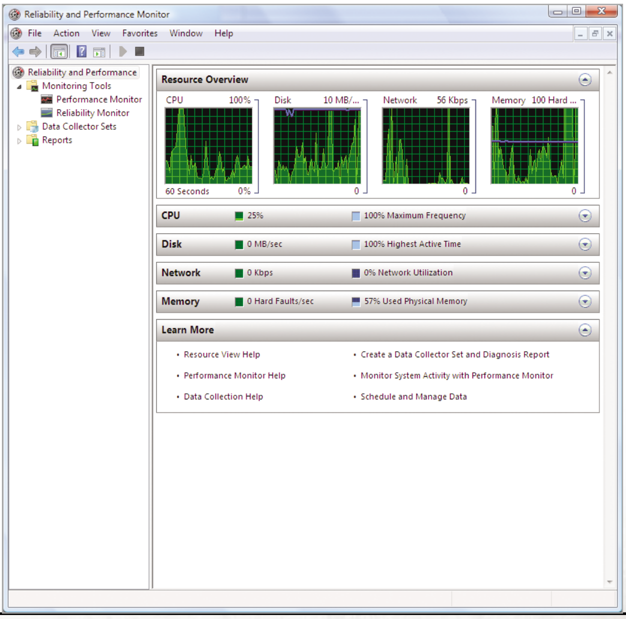
The Windows Experience Index is a rudimentary test, but relatively low numbers strongly indicate a performance bottleneck.

Maximize Hard Drive Performance

Even the fastest CPU and RAM sticks are at the mercy of the hard drive, which to this day tends to be the PC's biggest performance bottleneck. As with most hardware, the first order of business is updating the firmware. Head to the manufacturer's Web site to check for an update. If you don't see anything, contact customer service to see if an update is available elsewhere, because they aren't always available at the support sites.

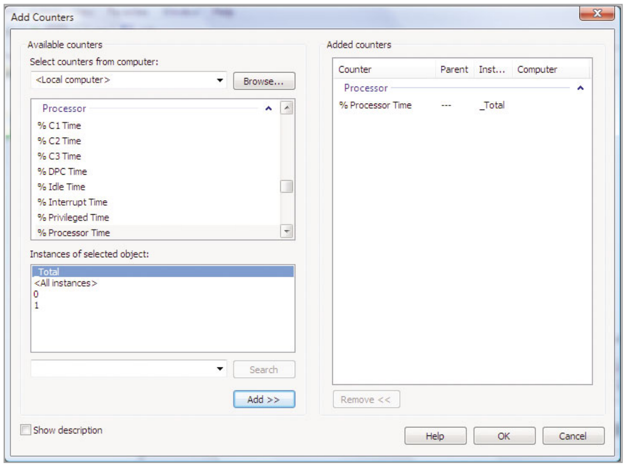
Next, you want to diagnose the hard drive to make sure it's working normally. A good tool for this is HDTune (Free; www.hdtune.com), which can benchmark performance, scan drives for errors, and report temperatures so you'll know if the drive is running hot. (Temps above 55 degrees Celsius will trigger an alert.) Use the benchmark utility to see if the drive is running close to its published stats. If it isn't, check your BIOS settings to make sure the drive interface is set up according to the recommendations in the HDD's users manual. While you're there, check the HDD Acoustic Mode (if available) and make sure it isn't set to Quiet, as any of the other settings provide a slight performance boost.

If you use a SATA drive and are poking around in the BIOS, think twice about



CPU	25%	100% Maximum Frequency
Disk	0 MB/sec	100% Highest Active Time
Network	0 Kbps	0% Network Utilization
Memory	0 Hard Faults/sec	57% Used Physical Memory

The graphs tell us this PC is having serious stress issues.



Performance Monitor is fully customizable and can track dozens of parameters.

enabling AHCI (Advanced Host Controller Interface), or consider disabling it if it's already enabled. Enabling this feature in Windows XP causes an Inaccessible Boot Device BSOD error if your hard drive and Windows AHCI drivers aren't all up-to-date. Vista is designed to accommodate AHCI out of the box, but turning it on after you install Vista can make the drive inaccessible if the AHCI driver (called Msahci.sys) is disabled when you throw the switch. AHCI sounds like a good thing because it enables NCQ, which tries to optimize the order of read and write commands. In reality, NCQ is designed for use in servers where multiple simultaneous read and write commands are common; the technology can actually slow down the stuff people normally run, especially games.

If you get horrible benchmark results with high CPU usage and have an IDE drive, there's a good chance the transfer settings aren't set up properly. Click Start, right-click Computer, click Properties, and click Device Manager. Expand the IDE ATA/ATAPI Controllers entry, right-click the entry for the IDE channel associated with the problematic drive, and click Properties. Click the Advanced Settings tab and make sure the Enable DMA box is checked before clicking OK. And, of course, if you discover the IDE cable connecting your hard drive to the motherboard is actually a 40-pin cable, swap it out for an 80-pin cable that supports the drive's faster modes.

If you don't have an ATA drive, you should still open the Device Manager, expand the Disk Drives entry, double-click the entry for your hard drive, and click Policies. Make sure the Optimize For Performance radio button is selected. If you see checkboxes for Enable Write Caching On The Disk and/or Enable Advanced Performance (the latter is not available in WinXP) only check them if your computer is plugged into a reliable UPS with battery backup that can automatically shut the computer down during a power outage. If you don't and check these boxes, the hard drive has an increased chance of becoming corrupt and unusable after a power outage. Both of these settings enable variations of write caching, which uses memory to record hard drive writes that haven't actually been written to the disk yet. The OS thinks the writes are complete and is freed to move to other tasks, boosting performance, while the hard drive grabs the writes from RAM when it's ready for them. The downside is that a power outage clears the RAM banks, deleting pending writes and causing data loss and possibly even corrupting the entire operating system.

Now switch to the Error Scan tab and click Scan to see if there are any damaged blocks. If there are, consider replacing the drive, because errors tend to pop up when a drive is going bad. The Health tab tells you if certain aspects of the drive are having problems, and if any of them are consistently yellow or red, you should also consider replacing the drive. Finally, use HDTune to check the drive's temperature. Ideally it should be well under 50 C, and temperatures above 55 C indicate that the drive could potentially fail unless the heat issue is resolved. If you see a very high heat reading but the drive seems to act normally, be sure to check with the manufacturer because some drives report faulty temperatures.

Always keep at least 10GB of space free on each installed drive and never fill a drive completely. No matter what you've heard about not needing to defragment NTFS drives, forget it. Defrag often for best performance, especially if you frequently install/uninstall large files.

Consider installing a second drive and adjusting the cache settings for an easy performance boost. To do this in Vista, click Start, right-click Computer, click Properties, and click Advanced System Settings. Click the Advanced tab, click Settings in the Performance box, click the Advanced tab, and click Change in the Virtual Memory box.

Some people recommend that you create caches with fixed sizes on both drives for best performance, but in Vista, we didn't notice any performance benefit with this method relative to letting Vista manage the caches itself. Just remove the check from the Automatically Manage Paging File Size For All Drives checkbox, click the entry for the first hard drive, and click the System Managed Size radio button. Click Set, click the entry for the second hard drive, and repeat the process. Restart the computer and see if your programs feel snappier.

Regardless of the cache settings you use, be sure to try out PageDefrag (Free; technet.microsoft.com/en-us/sysinternals), which defragments your system's virtual memory files.

What About RAID?

We lack the room to give you step-by-step instructions for setting up a RAID configuration, but we can walk you through the basics. The first thing to decide is what type of RAID controller to use. Most motherboards incorporate a hybrid RAID controller that isn't a full hardware peripheral because it doesn't have dedicated RAM or CPU chips. However, this type of controller is still better than a full software controller that tends to suck up computer resources. Most home users will get the most out of upgrading their motherboards to RAID models instead of spending the money on dedicated hardware controllers.

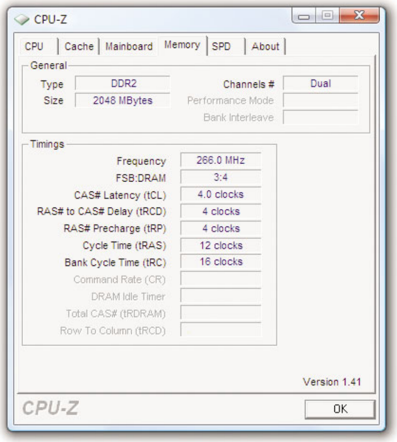
The next thing to decide is what type of RAID to use. RAID 0 (striping) boosts performance because it splits files between disks so multiple drives can do the work that a single drive would normally do. Unfortunately there is a significant drawback: If one drive fails, all data on both drives will be lost. Use it with two drives and you've just doubled your chances of losing all your data. It's good for speed freaks, but not so good for digital pack rats.

RAID 1 (mirroring) is more conservative, as it maintains an exact copy of data on two or more disks. This configuration offers good read performance since programs can read from the second drive when the first is busy, but write performance is poor because it must write data for as many drives as are in the RAID. The good news is that if one drive blows up, all of your data remains intact on the remaining drives. The bad news is that you only get to use half of the installed amount of storage space.

RAID 5 is a fairly popular option that requires a minimum of three drives, using data striping to mirror data in a way that the failure of one drive doesn't cause any data loss. This option offers faster write performance than RAID 1 and slower read performance than RAID 0. But it doesn't carry the risks associated with RAID 0, making it a good middle ground if you can accommodate all the required disks. Identical drives must be used, and overall capacity is that of the total number of disks minus one disk.

To combine the performance gains of RAID 0 with the fault-tolerance of RAID 1, you need at least four hard drives set up using a nested RAID level like RAID 0+1 or RAID 1+0.

RAID 0+1 uses two disks as a primary striped set, then uses the other two disks to mirror the primary set for improved fault tolerance. RAID 1+0, when implemented with four drives, creates two RAID 1 arrays and then uses RAID 0 striping on those arrays to boost performance. When choosing between the two, the main thing to keep in mind is that RAID 0+1 offers better performance, while RAID 1+0 offers better fault tolerance and speedier disaster recovery in the event of a failed drive.



Type: DDR2
Size: 2048 MBytes
Channels #: Dual
Performance Mode
Bank Interleave
Frequency: 266.0 MHz
FSB:DRAM: 3:4
CAS# Latency (tCL): 4.0 clocks
RAS# to CAS# Delay (tRCD): 4 clocks
RAS# Precharge (tRP): 4 clocks
Cycle Time (tRAS): 12 clocks
Bank Cycle Time (tRC): 16 clocks
Command Rate (CR)
DRAM Idle Timer
Total CAS# (tRDRAM)
Row To Column (tRCD)
Version 1.41

CPU-Z knows everything about your processor, motherboard, and memory.

Optical Drives

Optimizing optical drives requires many of the same techniques used for tweaking hard drives. Connect them using the fastest interface they support, and if they are ATA drives, never let them share the same channel with ATA hard drives (or the hard drive will slow to a crawl). Keep the firmware updated, and if you feel like benchmarking your optical drive, use Nero CD-DVD Speed (Free; www.cdspeed2000.com).

DMA makes a huge difference with optical drives, dramatically reducing their CPU usage to boost overall system performance. Open the Device Manager as described in the hard drive section but this time double-click the ATA channel where the optical drive is installed. Check the Enable DMA box if it's empty and look in the Current Mode list to make sure that the drive is using the fastest available DMA mode.

If you really want to boost optical drive performance, bypass it completely by mounting disc images on the hard drive and launching them using applications such as Daemon Tools (Free; www.daemon-tools.cc) or Virtual CD ($39.95; www.virtualcd-online.com). Hard drives operate much faster than optical drives, so using them as emulators makes disc loading times a thing of the past.

Don't Forget The Memory

The only reliable way to increase RAM performance is to physically install memory modules that have better specs than the ones already in the machine. Shoot for sticks that have the lowest CAS (Column Address Strobe) latency (listed as CL3, CL2, etc.). CAS latency measures how quickly the RAM responds to commands, and is often broken down into four separate RAM timings (2-2-2-6, for example). The first number is the total CAS Latency (tCL or tCAS). The second number (tRCD) represents the number of clock cycles required for the stick to find the proper RAS (Row Address Strobe) and CAS in the memory banks after a read or write request is made. The third value (tRP) tells you the number of clock cycles required to close an open memory row so a new row can be opened. Finally, the fourth value (tRAS) represents the minimum clock cycles required to close an open row and access a new row.

By the way, if anyone ever tells you to enable the LargeSystemCache Registry entry, smack them. What sounds like a good thing is a setting meant for servers that actually slows down home PCs. Enabling it lets virtual memory access nearly all of the computer's RAM, leaving little behind for your programs to use. Also, if you have a 32-bit version of Vista, forget about installing 4GB of RAM, as only 3GB will be accessible. Vista reserves a chunk of addressable RAM space for video cards and other hardware, so the only way to access 4GB or more is to upgrade to a 64-bit version of the operating system.

Out With The Old

Fiddling with hardware settings will only take you so far, and often the only noticeable performance gains come from installing better hardware. If you decide to go this route but your budget is tight, focus on memory first because it's so inexpensive. Then, think about installing a faster hard drive. CPU upgrades often are accompanied by complete motherboard swaps, (which require a whole new round of configuring and tweaking), so save those upgrades for last. △

by Tracy Baker

Digging Deeper: System Analysis Tool Roundup

System Monitor is a handy tool for barebones performance tracking over a period of time, but there are better programs if you want to quickly benchmark your entire computer.

FreshDiagnose
Free
Fresh Devices
www.freshdevices.com
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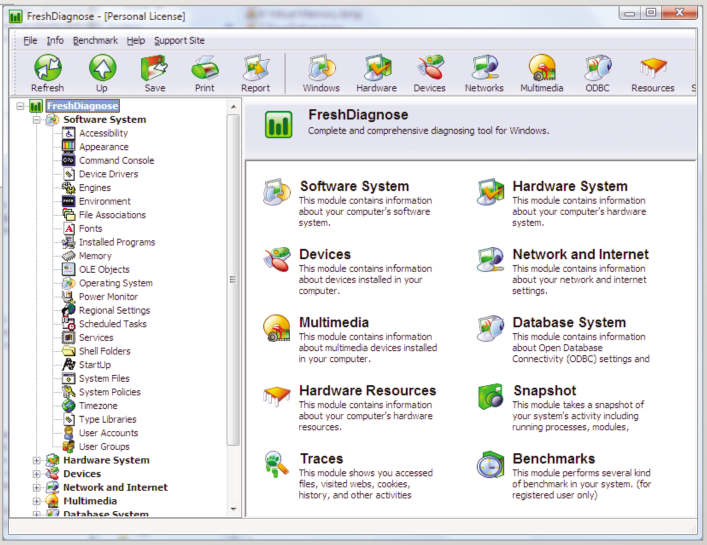


FreshDiagnose
Complete and comprehensive diagnosing tool for Windows.

Software System
This module contains information about your computer's software system.

Hardware System
This module contains information about your computer's hardware system.

Devices
This module contains information about devices installed in your computer.

Network and Internet
This module contains information about your network and internet settings.

Multimedia
This module contains information about multimedia devices installed in your computer.

Database System
This module contains information about Open Database Connectivity (ODBC) settings and

Hardware Resources
This module contains information about your computer's hardware resources.

Snapshot
This module takes a snapshot of your system's activity including running processes, modules,

Traces
This module shows you accessed files, visited webs, cookies, history, and other activities

Benchmarks
This module performs several kind of benchmark in your system. (for registered user only)

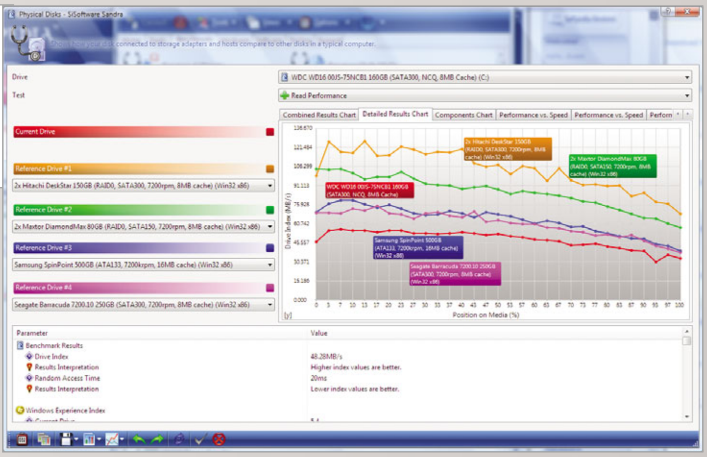
Fresh Devices FreshDiagnose

This software has a nice interface, reports plenty of system information, and can benchmark nearly every piece of hardware installed on the computer. But the hardware list it compares your hardware to after the benchmark is complete is woefully out of date. And the software crashed a few times during benchmarking, so it's not as reliable as some of the other products we tested.

SiSoft SANDRA Lite XII

Although the pay version gives you a lot more features, SiSoft SANDRA Lite is an excellent tool for zeroing in on bottlenecks, thanks to extensive benchmarking abilities. Its interface makes it very easy to use, and the freeware version is surprisingly useful, considering how many options are grayed out and only available in the $29.99 and up commercial versions.

Sandra Lite XII
Free
SiSoft
sisoftware.net
●●●●



Shows how your disk connected to storage adapters and hosts compare to other disks in a typical computer.

Drive: WDC WD16 00JS-75NCB1 160GB (SATA300, NCQ, 8MB Cache) (C:)
Test: Read Performance

Reference Drive #1: 2x Hitachi DeskStar 150GB (RAID0, SATA300, 7200rpm, 8MB cache) (Win32 x86)
Reference Drive #2: 2x Maxtor DiamondMax 80GB (RAID0, SATA150, 7200rpm, 8MB cache) (Win32 x86)
Reference Drive #3: Samsung SpinPoint 500GB (ATA133, 7200krpm, 16MB cache) (Win32 x86)
Reference Drive #4: Seagate Barracuda 7200.10 250GB (SATA300, 7200rpm, 8MB cache) (Win32 x86)

Parameter	Value
Benchmark Results	
Drive Index	48.28MB/s
Results Interpretation	Higher index values are better.
Random Access Time	20ms
Results Interpretation	Lower index values are better.
Windows Experience Index	

Lavalys Everest Ultimate Edition

If you want to know everything—and we mean everything—about your hardware, Everest Ultimate Edition is worth every penny. It'll dig up details that you didn't even know existed, generate clear reports, and benchmark nearly every aspect of PC performance. Best of all, once the benchmarks are completed, the software shows where your hardware sits relative to a long list of current and legacy hardware, so you can keep a clear upgrade path in mind should you decide to swap out hardware instead of merely tweaking it. No other program we tested offered such a comprehensive system reporting and benchmarking suite. △

Everest Ultimate Edition
$34.95
Lavalys
www.lavalys.com
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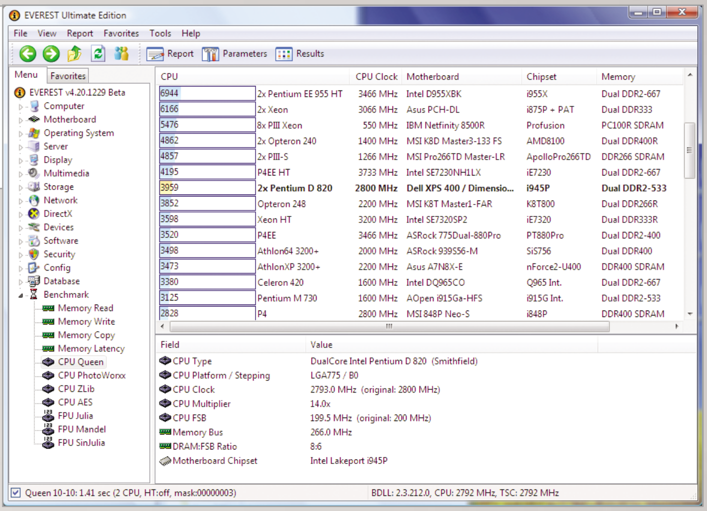


CPU		CPU Clock	Motherboard	Chipset	Memory
6944	2x Pentium EE 955 HT	3466 MHz	Intel D955XBK	i955X	Dual DDR2-667
6166	2x Xeon	3066 MHz	Asus PCH-DL	i875P + PAT	Dual DDR333
5476	8x PIII Xeon	550 MHz	IBM Netfinity 8500R	Profusion	PC100R SDRAM
4862	2x Opteron 240	1400 MHz	MSI K8D Master3-133 FS	AMD8100	Dual DDR400R
4857	2x PIII-S	1266 MHz	MSI Pro266TD Master-LR	ApolloPro266TD	DDR266 SDRAM
4195	P4EE HT	3733 MHz	Intel SE7230NH1LX	iE7230	Dual DDR2-667
3959	**2x Pentium D 820**	**2800 MHz**	**Dell XPS 400 / Dimensio...**	**i945P**	**Dual DDR2-533**
3852	Opteron 248	2200 MHz	MSI K8T Master1-FAR	K8T800	Dual DDR266R
3598	Xeon HT	3200 MHz	Intel SE7320SP2	iE7320	Dual DDR333R
3520	P4EE	3466 MHz	ASRock 775Dual-880Pro	PT880Pro	Dual DDR2-400
3498	Athlon64 3200+	2000 MHz	ASRock 939S56-M	SiS756	Dual DDR400
3473	AthlonXP 3200+	2200 MHz	Asus A7N8X-E	nForce2-U400	DDR400 SDRAM
3380	Celeron 420	1600 MHz	Intel DQ965CO	Q965 Int.	Dual DDR2-667
3125	Pentium M 730	1600 MHz	AOpen i915Ga-HFS	i915G Int.	Dual DDR2-533
2828	P4	2800 MHz	MSI 848P Neo-S	i848P	DDR400 SDRAM

Field	Value
CPU Type	DualCore Intel Pentium D 820 (Smithfield)
CPU Platform / Stepping	LGA775 / B0
CPU Clock	2793.0 MHz (original: 2800 MHz)
CPU Multiplier	14.0x
CPU FSB	199.5 MHz (original: 200 MHz)
Memory Bus	266.0 MHz
DRAM:FSB Ratio	8:6
Motherboard Chipset	Intel Lakeport i945P

Queen 10-10: 1.41 sec (2 CPU, HT:off, mask:00000003) BDLL: 2.3.212.0, CPU: 2792 MHz, TSC: 2792 MHz

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Fitness-Bike-Assisted Power Supply might seem like another ingenious way to decrease power consumption and do your part to save the environment. But there is a less ridiculous method. With Toughpower's industry-leading 87% plus power efficiency and patented 140mm dual bearing fan, you'll enjoy lower electricity bill and lowest heat output. So log on to www.thermaltakeusa.com now to find out how Thermaltake is leading the way in creating market's most trusted power supply.

Toughpower is available in 600W, 650W, 700W, 750W, 850W, 1000W, 1200W & 1500W (available with Cable Management)

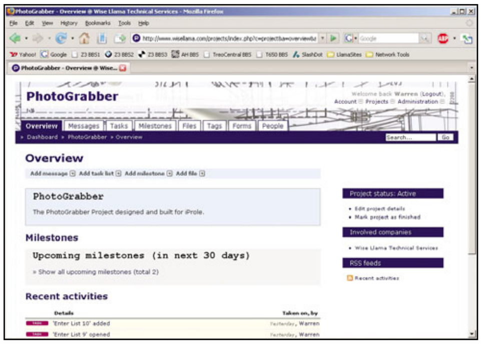
Thermaltake COOLall YOUR LIFE Toughpower™ 5 YEAR WARRANTY NVIDIA SLI READY 80 PLUS

DELL www.dell.com RadioShack MICRO CENTER Fry's BEST BUY newegg.com circuit city TigerDirect.com amazon.com and you're done.

The Bleeding Edge Of Software

Inside The World Of Betas

ProjectPier 0.8


PhotoGrabber - Overview @ Wise Llama Technical Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.wisellama.com/projects/index.php?c=project&a=overview&
PhotoGrabber
Welcome back Warren (Logout),
Account Projects Administration
Overview Messages Tasks Milestones Files Tags Forms People
» Dashboard » PhotoGrabber » Overview
Search... Go
Overview
Add message Add task list Add milestone Add file
Project status: Active
• Edit project details
• Mark project as finished
Involved companies
• Wise Llama Technical Services
RSS feeds
Recent activities
Milestones
Upcoming milestones (in next 30 days)
» Show all upcoming milestones (total 2)
Recent activities
Details
Taken on, by

PhotoGrabber

The PhotoGrabber Project designed and built for iProle.

'Enter List 10' added — Yesterday, Warren

'Enter List 9' opened — Yesterday, Warren

Official Product Name: ProjectPier
Version # Previewed: 0.8
Publisher: The ProjectPier Team
Developer and URL: The ProjectPier Team, www.projectpier.org
ETA: Q2 2008
Why You Should Care: A hosted, free alternative to BaseCamp is always handy to have to coordinate groups.

It might be said that Online Group Collaboration is the new black, and if that's the case, then 37signals' BaseCamp (www.basecamp.com) is one of the more fashionable Web sites out there. Despite its popularity, BaseCamp has its share of legitimate gripes (more below), and one disgruntled, yet talented user created activeCollab (www.activecollab.com) as a result. Though it was free during development, activeCollab is no longer free software, so several users of its last Open version forked it into the "always open and free" ProjectPier software, which is now spreading its wings to version 0.8.

ProjectPier is Web software that requires a server with PHP5 and MySQL, which includes most Web hosts, but it also works just fine on a thumb drive with Uniform Server or on a Windows computer running XAAMP: Just create a MySQL database, FTP the source files to the Web server, and follow the prompts at the setup URL. We had it up and running in five minutes, including the upload.

Like BaseCamp and activeCollab, ProjectPier lets multiple users work together on Projects, which are divided into dated Milestones and Tasklists filled with the tasks needed to meet each Milestone. Each Project can have a library of files and folders and threaded messages, which acts sort of like a project forum. Still lacking is time management, whiteboarding, and a basic calendar, though ProjectPier outputs iCal-compatible files via a URL, so linking a Google Calendar to Milestones is pretty simple. You can optionally designate "client users" who basically only have read access to data, which is a handy way to allow customers to see how your group's actions are progressing.

The beauty of ProjectPier is that you run it on your own servers, meaning that you always have full access to your data, rather than entrusting it to a third party. Its open status lets you manage as many projects as you like for the low, low price of nothing.

ProjectPier still has a long way to go to match the features of its pricier competition, but it is already fast and stable with an enthusiastic developer base. ▲

by Warren Ernst

Engage 1.2.3.89 Beta

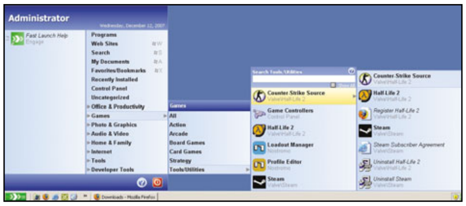
Have you ever thought that the Windows Start menu would benefit from a heaping tablespoon of smarts? If so, then Engage is probably the answer to your Start menu dreams, loading a bunch of new features into what you thought was a decent way to start programs.

Once installed, Engage replaces the Start menu with a new Engage menu (pressing ALT-ESC brings up the old Start menu if you need it), appearing in the lower-left corner of the Windows desktop.

Engage divides the classic Start menu into three sections. The first are for your most used or favorite apps, with each accessible with a Function key (F1-F8) after pressing the Windows key. The second section attempts to group your applications into categories, such as Games, Office & Productivity, Internet, Tools, and so forth. Categories are determined by other Engage users rather than some dated list or questionable algorithm, so it seems to make the right choices most of the time. There's also an Uncategorized category for miscellaneous programs, along with the Control Panel and Recently Installed categories.

The third section is a filtered list of "stuff," working rather like Launchy. Choose Programs, Bookmarks, Web Sites, or My Documents and you get a filtered list—just start typing what you're looking for and the list of everything in your PC filters down to match. Finally, there's a Web Search field, letting you perform a quick search with Yahoo!, Google, eBay, or pretty much any Web site that has a Search function. You can add new search sites too.

Engage has a lot of shine and polish, and it feels pretty snappy on a Pentium 4 or faster PC. It's liable to freak out anyone using your PC who isn't expecting something different in place of the Start menu, but that might be an advantage, as well. ▲



Official Product Name: Engage
Version # Previewed: 1.2.3.89 Beta
Publisher: LyricCode Software
Developer and URL: LyricCode Software, www.lyriccode.com
ETA: Q2 2007
Why You Should Care: If you've ever found your Start menu lacking, Engage is your tool of choice.

by Warren Ernst

UP TO SPEED

Upgrades That'll Keep You Humming Along

Some meaty updates to important programs this month bring us a major update to Vista and to the Xbox Dashboard interface. iPhone users also get more power from Apple's Garage Band and from Google.

Software Updates

Adobe Camera Raw 4.3.1

Along with the Adobe DNG Converter, the Camera Raw plug-in for Photoshop CS3 lets you work with the highest-quality, unprocessed image files from digital cameras. The new version supports the latest models from Canon, Nikon, Olympus, and Panasonic.

www.adobe.com

Foobar2000 0.9.5

The alternative media player gets a new default user interface that provides more flexible customization with album lists and art. There have also been improvements to the converter, which now can handle AU/SND and AIFF files and updates FLAC support.

www.foobar2000.com

Garage Band 4.1.1

The Mac-only application now has the ability to create custom ringtones for the Apple iPhone. You need iTunes 7.5 or later, to which Garage Band can now send an audio snippet of up to 40 seconds to transfer to the phone as a ringtone.

www.apple.com

Google for iPhone

The search portal upgrades its m.google.com mobile site to recognize the iPhone Safari browser and serve a dedicated Web app. It puts all of the major Google services (search, Gmail, Calendar, Reader, and more) into a single AJAX-driven interface.

m.google.com

Google Toolbar 5

The ubiquitous browser add-on now lets you access Google Gadgets directly from the toolbar. Filling in forms on Web pages is now easier, and the Notebook copy service is now integrated with the add-on. Initially, this upgrade is for Internet Explorer only.

www.google.com

Microsoft Office 2007 SP1

The first major update to the latest office suite from Microsoft pulls together recent fixes and patches. Compatibility between Office 2007's new file formats and previous Office files has been improved, and support for the upcoming Windows Server 2008 is new.

www.microsoft.com

Paint.net 3.2

The open-source image editor improves the motion blur effect and the radial and zoom blurs. The rectangular selection tool now can draw a selection based on fixed size or fixed ratio. New Mandelbrot fractal and Julia fractal effects have been added, and the twist distortion gets a broader range of options.

www.getpaint.net

Windows Vista SP1 beta

Available as a public beta, the first service pack for Vista claims "performance and power consumption improvements." Microsoft includes a tweaked IE7 and a roll-up of security patches. New APIs let third-party security software work more easily with part of the OS kernel.

www.microsoft.com

Xbox 360 2007 Dashboard

The mandatory auto-update of the game console upgrades almost all aspects of the system: video playback quality improvements (including DivX support), new ways to sort and play back stored or networked multimedia, full-screen previews in the Video Marketplace, and improved device support for newer iPods and iPhone.

www.xbox.com

Yahoo! Konfabulator 4.5

The widget engine from Yahoo! now lets you embed HTML and even AJAX code for greater interactivity in a widget. You also can deploy a Flash widget. Because the entire engine was overhauled, Yahoo! warns there may be some compatibility issues developers should test with their older widgets.

widgets.yahoo.net

Driver Bay

ATI Catalyst 7.11

Loads of game fixes in this version of the Radeon drivers. For Vista, look for improvements in BioShock, Call of Juarez, and Hellgate, as well as fixes for Roxio Creator Premier 9 and Google Sketchup. In WinXP, some issues in Quake Wars and Unreal Tournament have been resolved.

www.ati.com

FFDShow MPEG-5 Video Decoder 20071206 rev1685 Beta 4

This DirectShow decoding filter fixes issues with losing A/V in FLAC and TTA. It also resolves crashes in Windows Movie Maker and cleans up occasional noise in DTS S/PDIF pass-through audio.

sourceforge.net/projects/ffdshow

K-Lite Mega Codec Pack 3.6.0 Beta

The codec pack for Windows OSes updates ffdshow, DivX, madFLAC, and Cyberlink MPEG-2 drivers to recent versions. This bundle prevents installation of some incompatible programs in Vista and Windows 2000.

www.codecguide.com

by Steve Smith

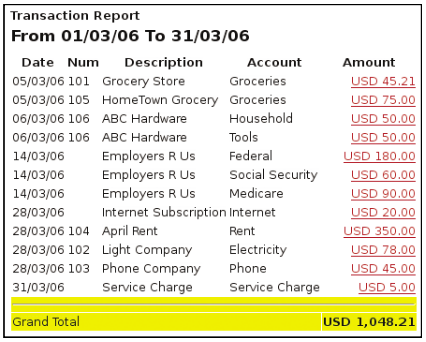
Money Matters

Free Software For Personal Money Management

Accounting may not be sexy, but it's been driving computing technology since the beginning of time. (You didn't think all those 1950s-vintage, locomotive-sized mainframes were running Web browsers and playing MP3s, did you?) And the one area in which Linux still lags is personal money management. If you want state-of-the-art personal finance software, you must buy it from the Intuit Quicken/Microsoft Money axis of proprietary software, although if you can do without the bells and whistles, Linux-based open-source solutions will get the job done, as will Moneydance (www.moneydance.com), a proprietary product that runs on Linux as well as Windows and OS X (see the "Moneydance 2007" sidebar for more info). But no one will fault you if you opt to retain at least one Windows PC just for personal finance; open source can't (yet) compete with Intuit's 25 years experience, 8,000 employees, and $2.6 billion annual revenues, let alone Microsoft.

The outstanding open-source money management program is GnuCash (www.gnucash.org). While other programs may be suitable for many users, GnuCash is head-and-shoulders ahead of the crowd for usability, stability, features, and support.

The biggest advantage proprietary financial apps have over their open-source equivalents is integration, or the ability to combine your financial activities with online transactions, bill paying, accessing and reporting data from online accounts, and plugging tax-related data from your money manager into income tax software (see the "Open-Source Tax Software" sidebar in this article). If you need that kind of integration, you can safely skip the rest of this article and continue using your proprietary finance software. If you prefer to avoid such Web connectivity and the potential security issues it may create, however, open-source finance software provides a great alternative, so read on.



Transaction Report

From 01/03/06 To 31/03/06

Date	Num	Description	Account	Amount
05/03/06	101	Grocery Store	Groceries	USD 45.21
05/03/06	105	HomeTown Grocery	Groceries	USD 75.00
06/03/06	106	ABC Hardware	Household	USD 50.00
06/03/06	106	ABC Hardware	Tools	USD 50.00
14/03/06		Employers R Us	Federal	USD 180.00
14/03/06		Employers R Us	Social Security	USD 60.00
14/03/06		Employers R Us	Medicare	USD 90.00
28/03/06		Internet Subscription	Internet	USD 20.00
28/03/06	104	April Rent	Rent	USD 350.00
28/03/06	102	Light Company	Electricity	USD 78.00
28/03/06	103	Phone Company	Phone	USD 45.00
31/03/06		Service Charge	Service Charge	USD 5.00
Grand Total				**USD 1,048.21**

GnuCash provides a wide range of reporting tools to drill down into your financial data.

The most visible differences between Quicken and Money and even the best of the open-source apps are in the "fit and finish" departments. For the smoothest, most user-friendly interactions and reports on your accounts, stick with Quicken or Money. If you don't need as much hand-holding or fancy chrome—or if you just prefer Linux—then you'll find most of the open-source options adequate, at least.

Most open-source money management programs support the bookkeeping basics you're already familiar with: setting up accounts (for assets and liabilities), categories (for budgeting and tracking), and entering transactions (for moving money from one place to another). All but two of the programs discussed here run on Linux, but most are cross-platform Java or traditional apps ported to Windows, OS X, and/or other platforms.

Choose Wisely

Selecting an open-source financial program is pretty much the same process as choosing proprietary software. Sure, ease of use and ease of installation are important to any software, but reliability and accuracy are much more important for financial software. You usually get those from big teams with lots of experience. Development began on GnuCash in 1999, but it has more going for it than age, including backing from the GNOME desktop environment project, lots of developers and contributors, excellent and complete documentation, and almost a decade of use and improvement, as well as frequent major and minor upgrades. You can even run it on Windows.

If GnuCash isn't for you, other open-source options offer value, too: portability from Java-based apps like jGnash, ease of use from the simplified interfaces of Buddi or Eqonomize!, euro-centric options from Grisbi or Monex, and PDA support from FreeCoin (Palm OS) and Grisbi (Zaurus).

When you're evaluating open-source money management software and you're "upgrading" from a commercial product, look for data import support for your old program, but beware: Data import can still be a fairly tedious account-by-account chore. Also be sure to compare features, including support for investment and equity accounts, encryption, custom reporting, scheduled transactions, check printing, budgeting, financial calculators, and so on. Check support for managing accounts, checking investments, and paying bills online, because as we mentioned earlier, proprietary software tends to do better with online integration. Consider which platforms you need support for, including PDAs, and for open-source projects, consider the stability and experience of the development team, as well as whether third-party support is available. Check out the user forums, too, to get an indication of what kinds of problems users are experiencing, as well as how quickly problems are resolved.

One trick to quickly figure out whether a program does what you want is to skip the Features summary and look for some kind of road map, a requested features list, or a planned features list. If a feature has been requested or is planned for a future release, you can bet it's not yet supported.

GnuCash

GnuCash (www.gnucash.org, 4 CPUs) is a full-featured, double-entry accounting program and has all the features you need to track household expenses and investment portfolios. GnuCash even permits small businesses to generate invoices and manage accounts payable and receivable. The program also supports downloading transaction data in OFX (Open Financial Exchange) format. (European users whose banks support the HBCI format can initiate transactions, as well.)

GnuCash has the most, and most desired, features of any open-source program mentioned here. Not only does it do the basics, but it also includes key features missing on most other projects, such as check printing and live updates for stock prices. The developer and user communities are quite active, but discussion is held on old-fashioned mailing lists (rather than Web-based forums). The archives are easy enough to search and handily go back to 1998.

When you first open GnuCash you can opt for a simplified initial configuration that looks and acts much like a standard hard-copy checkbook register, or jump right in and build a complete accounting hierarchy. If you're a Quicken veteran, many of the basic keystrokes and functions (like + to increment check numbers) are implemented here, as well. You can supplement its dozens of standard reports with your own custom reports and export them all to HTML if you want; data import is supported for OFX/QFX and QIF formats.

The best open-source developers tend to be liberal about releasing updates and upgrades and conservative when it comes to determining whether the upgrades are production quality or still in beta. GnuCash is well out of beta at version 2.2.1, running on Windows as well as most *NIX OSes and Mac OS X. First released in 1999, GnuCash has gone from being a fragile, hard-to-install beast to being an almost-one-click-installable thoroughbred, capable of serving the complete newbie who just wants a simple digital checkbook manager to the small business person who needs to deal with invoices, accounts payable, and accounts receivable.

Open-Source Tax Software

Given the complexity of federal and state tax codes, it should come as no surprise that no one has yet produced an open-source version of TurboTax. Perhaps someday Intuit will roll out a Linux version, but until then, Linux users are out of luck. That's not to say there's no open-source tax help out there, though.

TaxGeek (taxgeek.sourceforge.net) gives Linux users an interface for filling in standard income tax forms. It won't replace interview-based proprietary tax programs you'd buy at Staples, but it's a first step in that direction.

The Tax Code Software Foundation (www.taxcodesoftware.org) looks like the future of open-source tax software, except for one thing: It doesn't seem to have much software available yet. The Foundation uses the Mozilla Public License, and its mission is to produce tax code software. We'll have to keep tabs on it to see how that works out; in the meantime, if you're interested in contributing your time and skills, check out the Web site.

Open Source Tax Solver (opentaxsolver.sourceforge.net) is likewise not the super-friendly hand-holding tax software you'd expect from a big proprietary software company, but it's a (baby) step in that direction. It's meant to be used in conjunction with your tax forms and government-issued tax booklets, as a sort of open-source tax worksheet program that can help you fill in the blanks on those forms. ▲

Open-Source Alternatives

KMyMoney (kmymoney2.sourceforge.net, 3.5 CPUs) is still technically a beta release (0.8.8) despite its long history (first released in 2000). Key features, such as support for online banking, check printing, budgeting, and advanced reporting, are scheduled for the 1.0 release, and if you're not running KDE, you may have trouble getting online help. However, it offers a sweet GUI interface that works well in KDE and supports investments, including online stock pricing, and offers a pretty extensive selection of customizable reports. While the project goals include mirroring features of commercial products, KMyMoney is designed for personal finances, period. So if you're looking for small-business accounting features, such as invoicing and billing, stick with GnuCash.

Buddi (buddi.thecave.homeunix.org, 3 CPUs) is a cross-platform Java app that is easy to install and easy to use, but is woefully underpowered, at least compared to more popular programs. For example, you're limited to three basic reports charting income and expenses and five basic graphs. You can add investment accounts, but you can't track stock values. Available plug-ins add such features as enhanced reports and data import and export. An active discussion forum gives users a place to ask and answer questions, as well as pass along feedback to developer Wyatt Olson, Buddi's driving force. Olson states that Buddi is "aimed at those who have little or no financial background. In making this software, I have attempted to make things as simple as possible, while still retaining enough functions to satisfy most home users." If you're looking for a simple solution, this may be it.

GFP Personal Finance Manager (gfd.sourceforge.net, 2.5 CPUs) is another cross-platform Java app with the benefit of translations to languages including Arabic, Brazilian Portuguese, Chinese (Simplified), English, French, German, Italian, Romanian, and Spanish. Originally developed in Brazilian Portuguese, documentation and user forums are sparser than for some of the more popular apps, but GFP may be worth it if it speaks your language.

Grisbi (www.grisbi.org, 2.5 CPUs) claims to be "easy personal finance for all," but it's probably easier for Europeans, especially Francophones, since the default currency is the euro and the FAQ is available only in French at present. It's too bad, too, since Grisbi seems to have a lot going for it, including a custom report-writing module. However, lacking support for tracking equity investments is almost as bad a fault as its integrated help features that seem to do nothing. On the other hand, Grisbi is developed in C and not only runs on Linux, *NIX, OS X, and Windows, but also on the

Zaurus PDA, which is excellent for Zaurus users.

Like so many open-source projects, Money Manager Ex (www.thezeal.com/software/index.php?Money_Manager_Ex, 2.5 CPUs) appears to be a one-person show, but it offers considerable functionality and a nice introduction usage tutorial. Currently still in beta (version 0.9.2.0), MMEX has many nice features for Linux and pre-Vista Windows, including support for depreciating assets and handy wizards for tasks such as adding new accounts. There's a nice tutorial to accounting that's translated into at least 19 languages and is worthwhile even if you just want an introduction to basic concepts.

Monex (monex.sourceforge.net, 2.5 CPUs) is a Windows-only solution developed in Europe that's still evolving (current release 0.721), with support for transaction scheduling, multiple currencies and currency exchange rates, and investment accounting. Monex might be enough for some users, as long as they can do without reporting, online access to exchange rates and securities pricing, and online banking.

JMoney (jmoney.sourceforge.net, 1.5 CPUs), another cross-platform Java application, was designed to be extensible, which means that rather than trying to implement as many bells and whistles as possible, JMoney supports the basics (transactions and accounts) but leaves "extra" features, such as reporting, online banking, and currency selection, to be supported through plug-ins—when the plug-ins are written, that is. JMoney may be best viewed as a starting point for developers who wish to extend it with new or interesting features, rather than as an easy way to track your personal finances.

jGnash (jgnash.sourceforge.net, 2.5 CPUs) offers a quick and easy tool for tracking account balances and transactions in the form of a relatively mature (version 1.11.5.1) cross-platform Java application. Notable for its extensive interface customizations, jGnash also provides some basic reporting, as well as support for online stock price updates and scheduled and/or recurring transaction reminders.

FreeCoins (freecoins.sourceforge.net, 2.5 CPUs) is an open-source app for Palm OS—remember Palm? The project's goal is to produce a GnuCash-style, full-featured finance manager for Palm OS, and so far so good, although you may need to do some heavy lifting to get FreeCoins to sync with a PC using companion program freecoinsExport for Linux and Windows. FreeCoins could be for you if you don't mind beta software (0.6.4) and you're looking for a Palm PDA program.

Eqonomize! (eqonomize.sourceforge.net, 3 CPUs) is "personal accounting software, with focus on efficiency and ease of use for the small household economy." A *NIX-only program, Eqonomize! may have just enough features for many users. At version 0.5-1, it still has room for improvement (and new features). Installation (via Ubuntu's Synaptic package manager) was a snap, and basic accounts setup is largely automatic. You can track your budget, investments, recurring income (e.g. salary), and nonrecurring income (e.g. bonuses or freelance work); schedule transactions; and generate basic graphic reports almost instantly. There's plenty you can't do, though, including get live stock prices or print checks. Also, it's designed for KDE, so GNOME desktop users may have trouble getting online help. For basic household accounting on Linux, Eqonomize! could be the answer. ▲

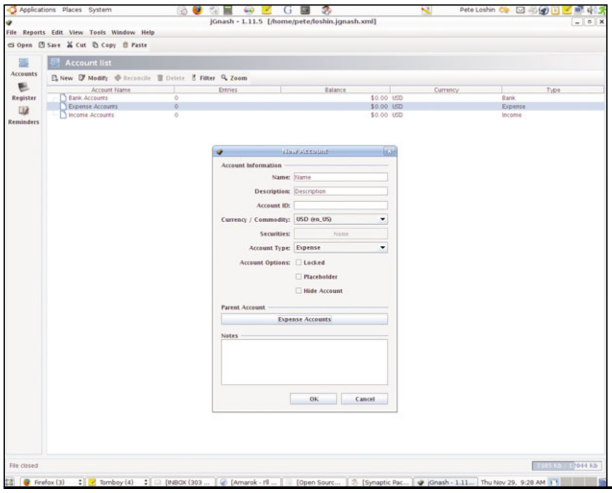
by Pete Loshin

Moneydance 2007

Moneydance 2007 (www.moneydance.com, 4 CPUs) may be proprietary software, but unlike Quicken and Money, it's a Java application and therefore runs on open-source operating systems, as well as Windows and OS X. Priced at just $29.99, Moneydance offers many of the same features as Quicken, but without being bound to a particular platform. A 30-day free trial version (limited to 100 transactions) is available, but installation is a little more complex than Quick-en's at the outset: You have to download a shell script, enable it as an executable, and close down all your other programs to begin the installation process. Installation was fast and easy enough for me, a Linux veteran, but I'm not sure about how a newbie would do.

So what does Moneydance offer that the competition can't? Unlike Quicken and Money, it runs on Linux, which is a big plus for some users. Moneydance also offers an active community forum, with lots of users' questions and answers. In addition to Moneydance staff contributions, many of the users are well-versed in the ins and outs of using Quicken, as well as Moneydance.

Other features include the ability to download extensions written by Moneydance or third parties to add capabilities such as credit card or loan calculators and live stock updates. ▲


Applications Places System
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Open Save Cut Copy Paste
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Reminders
Account list
New Modify Reconcile Delete Filter Zoom
New Account
OK Cancel
File closed
Firefox (3) Tomboy (4) [INBOX (303 ... [Amarok - ... [Open Sourc... [Synaptic Pac... jGnash - 1.11... Thu Nov 29, 9:28 AM

Account Name	Entries	Balance	Currency	Type
Bank Accounts	0	$0.00 USD		Bank
Expense Accounts	0	$0.00 USD		Expense
Income Accounts	0	$0.00 USD		Income

Account Information
Name: Name
Description: Description
Account ID:
Currency / Commodity: USD (en_US)
Securities: None
Account Type: Expense
Account Options: ☐ Locked ☐ Placeholder ☐ Hide Account
Parent Account: Expense Accounts
Notes

Adding a new account with jGnash is fast and straightforward.

CyberLink MagicSports 4

In a perfect world, we'd never be busy while our favorite baseball team is playing on TV, and our two favorite football teams would never play at the same time on different stations. But because sports lovers are forced to live in such an imperfect world, CyberLink has created MagicSports 4 so you'll never have to miss another big play.

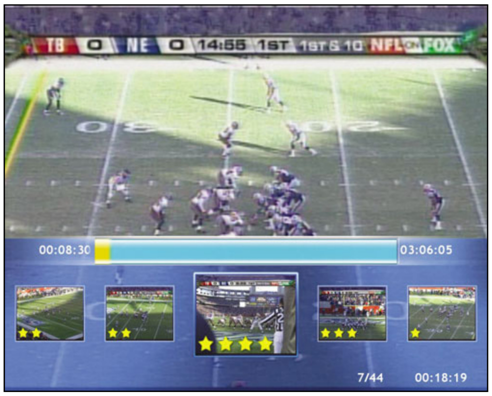
MagicSports 4 is an innovative program that works pretty well, except it's currently limited to only football, baseball, soccer, and sumo wrestling. In the MagicSports 4 program, you can either view the full game you've recorded onto your PC from your TV or just the highlights, which are gauged by the ambient crowd noise from each play. The highlights feature is what sets this program apart from others.

We uploaded the New England Patriots and Indianapolis Colts game from November 4th of the 2007 season and used the trial version to test MagicSports 4. Overall, MagicSports 4 was very accurate in determining highlights, and it increased its precision as the game moved forward. The first viewing of the game included a couple of commercial breaks in the first half, coupled with a lot of replays and commentary. But it also never missed a big play. The second time we viewed it, we selected the Enhance Accuracy option, which eliminated a lot of commentary and replays. The Enhance Accuracy option also got rid of all commercials.

MagicSports 4 picked about 15 to 20 plays per quarter, amounting to around a half hour of football from the three-hour recording. Some of the penalty calls and resulting referee explanations were also included. When you select to play the game in its entirety, you have the option of skipping a few seconds to find the next play, or you can switch over to the highlight reel.

MagicSports 4 is useful because you won't have to sit and watch the whole game, but it also gives you more than the few minutes of highlights you'd normally get from SportsCenter. However, support for other popular sports such as basketball could really improve the value of CyberLink MagicSports 4. ▲

by Tessa Warner Breneman



CyberLink MagicSports 4
$49.95
www.cyberlink.com
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Webroot AntiVirus With AntiSpyware & Firewall

You show us someone who says, "You can't have too much of a good thing," and we'll show you someone who has never used Webroot AntiVirus with AntiSpyware and Firewall. Webroot security products have always been a little large and a little slow, but with outstanding malware protection and a clear interface, such bloat was forgivable. The latest version adds many more layers of security but also adds layers of bloat and complexity where the competition is just as effective but remains lean and mean.

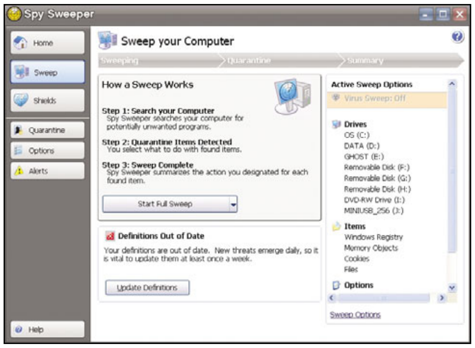
WAV is really a combination of two products: The first is the traditional Webroot Spy Sweeper, now fortified with Sophos' technologies and renamed, while the second is Webroot Desktop Firewall, which is actually now available for free as a download. Two separate installers add the products to your system, and there's no real integration between them, though at least they don't flag each other as security threats.

The Security Scanner constantly monitors the hiding places malware like to latch into, effectively preventing their installation in our tests. A background scanner monitors for viruses and memory resident spyware (though you must manually enable rootkit and keylogger checking, which is dumbfounding), but it manages to severely slow down launching programs and Web browsing. Boot time increased from 29 seconds to 1:46, being a good minute longer than any Symantec, Kaspersky, ESET, or AVG product we've tested recently. Our test machine simply failed to complete our disk-speed benchmark test, and a full malware scan took more than seven hours (versus 10 to 20 minutes for the competition).

The firewall is a mixed bag, as well. It leaves port 135 open, which even Windows' own firewall closes, for example. In an attempt to prevent annoying you with constant "Do you want to allow this application to access the Internet" questions, a three-day "learning mode" just assumes that everything run during the learning period is OK, which is definitely a bad assumption.

In the end, given a top-of-the-line PC that can resist slowdowns, WAV offers good malware protection and cleaning abilities. However, users concerned about PC speediness should look toward programs such as ESET NOD32 and SuperAntiSpyware. ▲

by Warren Ernst



How a Sweep Works

Step 1: Search your Computer
Spy Sweeper searches your computer for potentially unwanted programs.

Step 2: Quarantine Items Detected
You select what to do with found items.

Step 3: Sweep Complete
Spy Sweeper summarizes the action you designated for each found item.

Definitions Out of Date
Your definitions are out of date. New threats emerge daily, so it is vital to update them at least once a week.

Webroot AntiVirus With AntiSpyware & Firewall
$39.95
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Corel DVD Copy 6 Plus

Geared squarely for beginners, Corel DVD Copy 6 Plus makes it very easy to convert almost any video file from one format to another, including those formats used by most of the portable video devices on the market today, and conventional video DVDs. Unfortunately, the latest version lacks some of the advanced configuration options earlier versions possessed, and as before, the product's very name suggests a feature that it simply doesn't possess: the ability to duplicate protected, store-bought DVD movies, which, honestly, is what most people think of when they see the phrase "dvd copy."

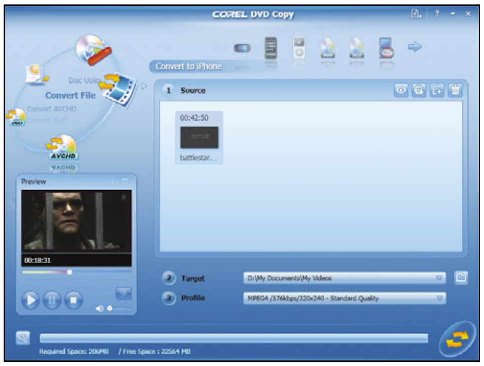
CDC6's interface is a marvel of simplicity, and it looks stylish, too. A rotating "wheel" of task icons in the top-left corner sets the program's operating mode: Convert File, Convert DVD (that is, an unprotected, unencrypted DVD), Convert AVCHD (used by hi-def camcorders), or Copy To Go. Next, select the desired output type from icons running along the top of the screen, such as Zune, iPod, PSP, iPhone, DVD, or VCD. Finally, with the rest of the window, select source files, destination folder, and desired resolution and file format (such as MPEG-4 or H.264, in the case of the iPhone).

Converting video formats takes significant time (converting a 44-minute DivX to an iPhone MPEG-4 takes 23 minutes on a P4 running at 3GHz), but CDC6 has several features to speed the process along. First, there are CPU optimizations for Intel Core 2 Duo and Quad processors. Second, an easy-to-use scheduler can run all conversions at night. Third, the Copy To Go mode transfers videos directly to iPods and PSPs, without the need to babysit the conversion process.

Conversions look great, but there aren't many options, so it's either "default" or nothing. For example, a widescreen DivX is "squished" into a 4:3 aspect ratio on an iPhone, whereas other tools let you either crop, add black bars to a screen's edges, or distort.

Still, such simplicity has its advantages for those who don't want to learn the ins and outs of video transcoding, and $49.99 is a fair price to pay for it. ▲

by Warren Ernst



Target: D:\My Documents\My Videos

Profile: MPEG4 /576kbps/320x240 - Standard Quality

Required Space: 206MB / Free Space : 22564 MB

Corel DVD Copy 6 Plus
$49.99
www.corel.com
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Roxio BackOnTrack 3

Getting people to back up their computers is like getting people to visit the dentist: Everyone knows they should do it, but they think they can get by without for years and years. Then the pain comes, and you either have lost your data or need a root canal; ouch. Roxio's BackOnTrack offers a relatively painless and inexpensive way to do both whole system backups, file-only backups, and even "restore points" that are much more thorough than what comes with Windows.

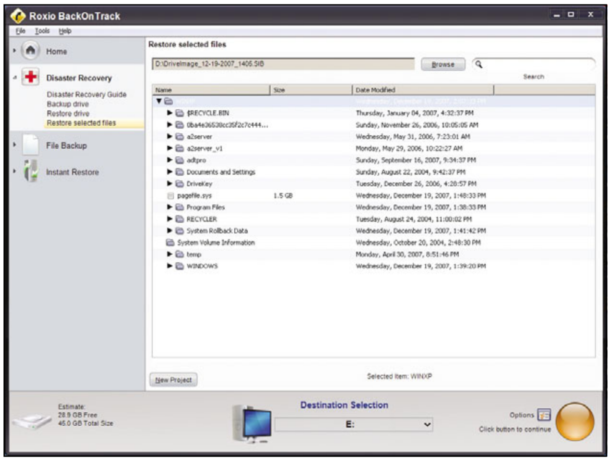
BOT3 makes a strong attempt to simplify what can be a complex task, but perhaps it goes a little too far. The Start menu, for example, has many icons (labeled Save State and Backup Drive, for example) that basically go to the same place: the BOT3 Home screen with a specific menu preselected. Bootable restoration discs are made automatically when making a disaster recovery disc set, but there's no menu command to make one on its own (so start making a disaster recovery set and then cancel it after making a recovery disc).

These small hiccups aside, BOT3 works wonderfully. It backed up a test partition of 17GB in about as much time as Norton Ghost, both on a second internal drive or to a set of DVDs. It installs a bootable environment accessible via a boot menu to allow for disaster recovery should Windows become corrupted (though it failed to work on a Windows 98/XP/Linux multiboot machine—use the recovery disc instead).

Wizards make it easy to back up just your data files, either on a schedule or manually, and you can quickly back up just certain file types. You can even set the backup routines to run whenever a certain external drive is connected to your PC, which makes the process about as automatic as it can get.

Despite some minor interface problems, BOT3 is probably the backup solution that Microsoft should have built into Windows. For less than $30, there's really no reason not to add it into your utility toolbox. ▲

by Warren Ernst



Restore selected files

D:\DriveImage_12-19-2007_1406.SIB

Name	Size	Date Modified
$RECYCLE.BIN		Thursday, January 04, 2007, 4:32:37 PM
0ba4e36530cc35f2c7c444...		Sunday, November 26, 2006, 10:05:05 AM
a2server		Wednesday, May 31, 2006, 7:23:01 AM
a2server_v1		Monday, May 29, 2006, 10:22:27 AM
adtpro		Sunday, September 16, 2007, 9:34:37 PM
Documents and Settings		Sunday, August 22, 2004, 9:42:37 PM
DriveKey		Tuesday, December 26, 2006, 4:28:57 PM
pagefile.sys	1.5 GB	Wednesday, December 19, 2007, 1:48:33 PM
Program Files		Wednesday, December 19, 2007, 1:38:33 PM
RECYCLER		Tuesday, August 24, 2004, 11:00:02 PM
System Rollback Data		Wednesday, December 19, 2007, 1:41:42 PM
System Volume Information		Wednesday, October 20, 2004, 2:48:30 PM
temp		Monday, April 30, 2007, 8:51:46 PM
WINDOWS		Wednesday, December 19, 2007, 1:39:20 PM

Selected Item: WINXP

Estimate:
28.9 GB Free
46.0 GB Total Size

E:

Roxio BackOnTrack3
$29.95
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

BEST BUY · COMPUSA WHERE AMERICA BUYS TECHNOLOGY · Circuit City · J&R · MICRO CENTER THE COMPUTER DEPARTMENT STORE · STAPLES · Fry's ELECTRONICS Outpost.com · amazon.com · buy.com · newegg.com · ZipZoomfly.com · DIRECTRON.COM

Dialogue Box

by Chris Pirillo

You (Too) Can YouTube

If a picture is worth a thousand words, then a video is worth a million. The exceptions to this rule are pictures and videos of me (which are, according to related eBay auctions, worth 27 cents).

By the time you read this, I will have surpassed 20,000 subscribers (and 800+ videos uploaded) on YouTube, which may not sound like a lot in the grand scheme of things. It's taken me over a year to reach that point, and it's taken others far less time to generate more followers (Oprah being one of them, and HouseholdHacker being another).

Oprah's a given with her a mass amount of supporters, but had you ever heard of HouseholdHacker before? No, but that isn't stopping tens of thousands of people from paying attention to the videos that team is producing. I've mentioned my YouTube channel before, and I'm guessing that many *CPU* readers already have an account on YouTube, as well. Even if you're not into creating your own content, you should be in tune to what's happening with the YouTube brand.

"Hey Chris, I've been watching your videos on YouTube, and I have a question for you." I get dozens of these emails every day. They don't necessarily know that I used to host a real television show, hosted a real radio show, have written books and magazine columns, hosted conferences, etc. They only know me through YouTube.

Need help with your own YouTube efforts?

Produce something worth watching. Make it genuine and original, if nothing else. Are your videos all about you, all about others, or all about the interplay between everyone?

Produce with some amount of regularity. Define your schedule and do your best to stick to it. There will be times you won't be able to publish according to your regular flow, but your audience should come to depend on something.

Don't get caught up in too much production or "post process" editing. That takes time, and often the extra time may not be worth it in terms of what your audience is most receptive to. There's no perfect camera; there's no perfect camera angle; there's no perfect microphone. Sometimes just "doing it" is all you need to do.

Have a backchannel. Whether it's a live chat room or some other kind of community, give your audience something else (and somewhere else) to find and interact with you (and each other).

Don't be afraid to share some kind of contact information. Create a special email address for direct YouTube emails so that your followers can find you without jumping through login screens or comment forms.

Establish your identity. People want to know who you are and what you're interested in. There will be times you'll stray from your core competency, but if your connection with the audience is true, everything will be fine.

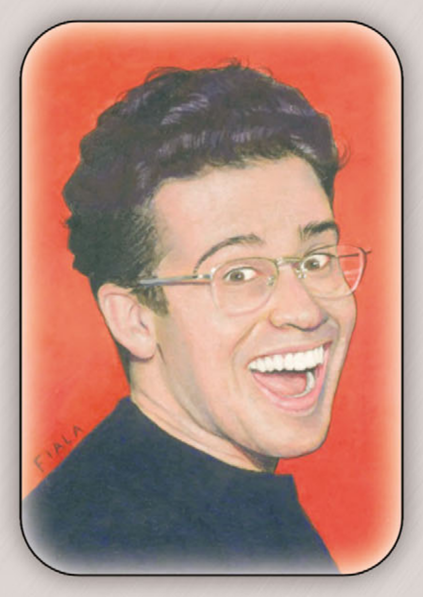
Participate! Do your best to interact with your audience, either in the video(s) or elsewhere. In the beginning, I subscribed to many people I wanted to follow but soon found that to be overwhelming. The people I pay attention to most are the people who reciprocate that attention.

Encapsulate! You want to be sure that if someone rips that video or posts it somewhere else, your entire message comes across. Slap text overlays atop the video before publishing it to YouTube so that your URLs and other elements are sewn into the entire experience.

Push and pull your audience from all directions. Don't expect YouTube to bring you gobs of traffic on a consistent basis. If you have social networks and an active friends list, let them know where they can find your work.

Humor. Even if you're not creating comedy videos, humor is always a good thing to have in the videos you create. You have to be able to deflect rudeness quickly, as it will surely come from some commenters. That definitely takes a sense of humor.

In many ways, these tips are applicable to any publisher—YouTube or not, video or not. Hopefully, they'll compel you to start something yourself (or begin a shelved project anew). I'm doing about five new videos every weekday on YouTube, myself. ▲



Chris Pirillo still wonders why people bother to watch and listen to the things he does online. He's a very boring individual, as witnessed every day on live.pirillo.com. His blog is followed by at least 12 people, since chris.pirillo.com does not roll off the tongue (and is virtually impossible to find in the search engines). He helps other experts blog on Lockergnome.com when he's not too busy helping people find bargains, coupons, and discounts through a revamped TagJag.com. Oh, and he has also successfully installed a camera on this magazine page and is watching you read this byline right now. Freaked? We thought so.

You can dialogue with Chris at chris@cpumag.com.

by Pete Loshin

Appliance Computing

Beige desktop PCs may be old hat, but the personal computing revolution is just starting. And it's going to have very little to do with those beige desktops and much more to do with open-source software. It's how Amazon can power their Kindle ereader appliance with Linux and still sell it as a proprietary piece of equipment, and why the OLPC XO (laptop.org) isn't so much a laptop as it is a "learning appliance."

In the 19th century, you could buy an engine to run your household. You'd hook up belts to drive a clothes washer, butter churn, vacuum cleaner, or window fan. But now, at the start of the 21st century, we're using PCs the same way, hooking them to peripherals to watch movies or record TV shows, play games, store music, talk on the phone, and shop.

A run-of-the-mill consumer PC is an informational engine, a general-purpose machine for running software that, when paired with the right peripherals, can do almost everything. They're the Swiss Army Knives of information: They do everything adequately, but nothing superlatively.

We're way past lashing up household engines to run the dryer. And we're moving past plugging everything into our PCs, too. Our iPods, gaming consoles, and mobile phones are all appliances: special-purpose computers that do one thing really well.

Linux has long been a favorite embedded OS for many of these appliances, especially mobile phones, the world's most popular information appliance. That influence can only increase, as Google's Linux-based mobile phone platform Android (code.google.com/android) and the Open Handset Alliance (www.openhandsetalliance.com) gain ground.

But let's focus on Kindle and the XO, two high-profile appliances that hit the market just in time for the holidays last year. Both are Linux-based, available for $400 (technically, you buy two XOs and donate one through the Give One Get One program), designed with specific goals. These underlying design goals are where you find the big differences.

Kindle is Amazon's self-contained reading platform and sales channel in the same way that Apple's touch is an all-in-one system for buying and enjoying A/V content—no PC required. You buy a Kindle to buy *and* read ebooks. Despite the marketing effort, not everyone loves it: Within a month, over 1,000 reviewers gave it an average rating of only three stars on Amazon.com, and almost 150 have tagged it "Kindle Swindle." Amazon publishes source code, but the Kindle license restricts what you can do with the hardware, wireless service, and content you buy. "Kindle editions" of retail books may lack graphics, footnotes, or other elements, further detracting from the reading experience. And it just looks hideous, somehow reminding me of Sinclair 99/T and Kaypro "luggable" PCs of the early '80s.

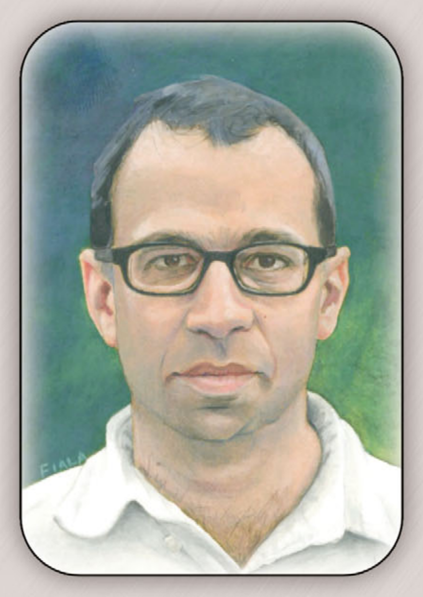
Ultimately, Kindle is for selling content and locking consumers into Amazon's ebook distribution scheme.

XO is a kid's version of what I've sought since 1988: a simple, portable, and cheap computer. A gig of flash memory, 256MB RAM, just enough CPU to run one application at a time, a built-in camera, a microphone, three USB ports, and an SD card slot.

Isn't the XO just another general-purpose computer? That I just said was *so* yesteryear? Yes, but it's not meant to be a PC: It's a tool for learning. The difference is in the GUI Sugar (wiki.laptop.org/go/Sugar), which is open-source and available to download. You can create new apps or modify existing ones. Most importantly, though, Sugar is designed so kids (or adults) can turn it on and start doing cool stuff right away.

I like the XO because I've used Sugar. (Check here next month for details.) I may like the idea of the Kindle, because it would be cool to have access to hundreds of books in a small, convenient form factor, but I'm waiting until they get it right by getting rid of the "Kindle editions," proprietary formats, and clunky hardware. ▲

You can get saucy with Pete at pete@cpumag.com.



Pete Loshin publishes LinuxCookbook.com, a place to learn even more about Linux. And don't forget to check out the new Ninitata.com, Pete's family-friendly fun and learning site.

In Your Facebook

Social Networking Is Here to Stay

Like every Internet fad of the last decade, from the globe to virtual 3D worlds, digital dating to Pets.com, it is hard *not* to look for the social networking bubble to burst. The meteoric rise of MySpace in 2005 attracted a staggering $650 million acquisition by Rupert Murdoch's News Corp. even before the company had demonstrated much ability to make money. Likewise, Google's $1.6 billion investment in YouTube is still in search of a viable business model. For years, MySpace was the very definition of social networking, but that was only after previous faddish locations such as Friendster and Xanga peaked and faded. In the past year, Facebook has come on strong to challenge MySpace hegemony. A partial investment in the site by Microsoft has ballooned the estimated value of this fledgling start-up to $15 billion. With so many companies coming and going, rising and falling so quickly, and with so much investor exuberance, it is easy to be skeptical. We have seen this kind of bubble behavior before. And because much of the social networking phenomenon has been driven by teens and young adults, one has to ask whether this trend has any more staying power than the popularity of Duran Duran or Britney Spears.

Fad Or No Fad

The raw numbers clearly point to social networking as something more than a fad. While many "next big thing" phenomena such as 3D virtual worlds seem to have peaked in the last year, posting personal profiles and using online networking tools such as MySpace and LinkedIn has moved far deeper than the fringe of early adopters, where most tech fads dwell. According to the newest Pew Internet and American Life study of youth and social media, almost half (47%) of online teens have posted photos online.

"Anything that has to do with communication and expressing yourself is where it is at right now," says Deborah Williamson, social networking expert and analyst at eMarketer. Her research finds that 72 million Americans are using some form of online social networking already, or 38% of the total U.S. population, and she projects that over half of us, well over 100 million, will be using the format by 2011. Like many analysts who saw this primarily as a youthful fad, Williamson herself expected at first that the trend would fade. "It's been surprising to me," she admits. When the Friendster and MySpace fashion of personal pages and networking emerged in 2004, adult observers often mistook it as youthful and fleeting. "I really thought after a while people would move on and do something else with their lives, but it is growing," she says.

A key indicator of social networking's solid hold on Internet usage is its rapid penetration into older users. Facebook.com, once restricted to college users, is now open to all audiences, and recent graduates are using the site as a foundation for communicating in their professional lives. While MySpace grew by 28% in traffic between October 2006 and October 2007, Facebook grew 118%. Growth in social network usage in 2007 was massive and comprehensive. In fact, even the less successful Spaces community offered by Microsoft couldn't help but grow a bit.

And the phenomenon clearly has gone global. According to comScore, sites such as Google's Latin American Orkut and the UK's Bebo have 24 million and 18 million monthly users, respectively, and the has-been U.S. network that many feel started it all, Friendster, has been gaining a new life in the Asian-Pacific region.

The key to social networking's success may be that it takes familiar behavior, communications and relationships, and amplifies their power with technology. In a recent online interview, LinkedIn's Vice President of Technical Operations, Lloyd Taylor, explained it succinctly: "What is so fascinating about this is that it is a whole new way of mapping what already exists in the real world, which is your network, our information consuming, or looking for information into a highly leveraged environment."

The Social Graph

More than just a faddish way of posting images of yourself and expressing your transitory tastes and romantic crushes, the reason social networking has grown is because it is a mode of communication in itself. Among the regular users of MySpace and Facebook, for instance, 41% send messages to friends over these networks every day. Many young users simply use the messaging tools within their profile pages in place of standard email or instant messaging. "MySpace is practically my life," says 15-year-old Samantha of Delaware. Like many of her friends, she keeps her personal page up on her PC at all times, monitoring it for new messages from friends and comments to the page. It's about both self-expression and direct peer-to-peer communication. And now that just about all of her schoolmates also have their own MySpace pages, it becomes a real-world social tool where she gets to know some of the passing faces in her crowded high school. "At school, people say they recognize me from MySpace."

This "map" of our social connections and the media we share is called a "social graph" by many in the industry, and digital analysts feel that it is this social graph that will become central to the future of the Web. "Social networking changes how we use the Internet," says Williamson. Almost all of the previous pieces of the Internet platform may be touched by this new way of communicating with a social graph and layering one's network of contacts onto familiar interactive activities. A new startup, Xobni, is about to launch an Outlook add-on that scans your email client to map your social graph, the amount of interaction you have with contacts, and the connections these contacts have to one another. Both Google and Yahoo! are working on projects that integrate their Web email clients with social networking capabilities, as well.

Online shopping, for instance, is poised to become a networked activity where personal profiles share one's shopping lists and preferred retailers, even lists of their recently purchased items. LinkedIn is offering an API that lets third parties link into the network of professional contacts. A user at early partner *BusinessWeek* will be able to mouse over a company name in an article and see in a pop-up window the people that they or their LinkedIn friends know in the company. The real significance of social networking may be in the way it amplifies the power of the information and research gathering we have already done for years online. Our browsing habits, favorite articles, and online shops will become part of the information we share with our trusted friends. "I think social networking as an activity will play a crucial role in how people use the Internet," says Williamson.

A Tool, Not A Toy

The major social networks in the U.S., especially Myspace, Facebook, and LinkedIn, each has evolved its own character and reputation online. MySpace, a music- and pop culture-oriented network, is identified more heavily with teen use, while Facebook only recently broadened its reach beyond the college crowd and into young professionals. One of the biggest success stories of the last year was the re-emergence of professional network LinkedIn, which grew 245% in unique visitors between November 2006 and November 2007, according to Nielsen Online. Professionals have been flocking to LinkedIn in the past year (now 17 million members and adding 1 million a month) as a tool for finding other people in their industry with the answers to pressing questions or just new recruits. LinkedIn is more like a massive address book of potential colleagues you can search according to their location, company experience, and skill sets. In a recent online video interview with AllThingsDigital's Kara Swisher, LinkedIn CEO Dan Nye says that "when it comes to getting things done and finding professionals, it takes LinkedIn."

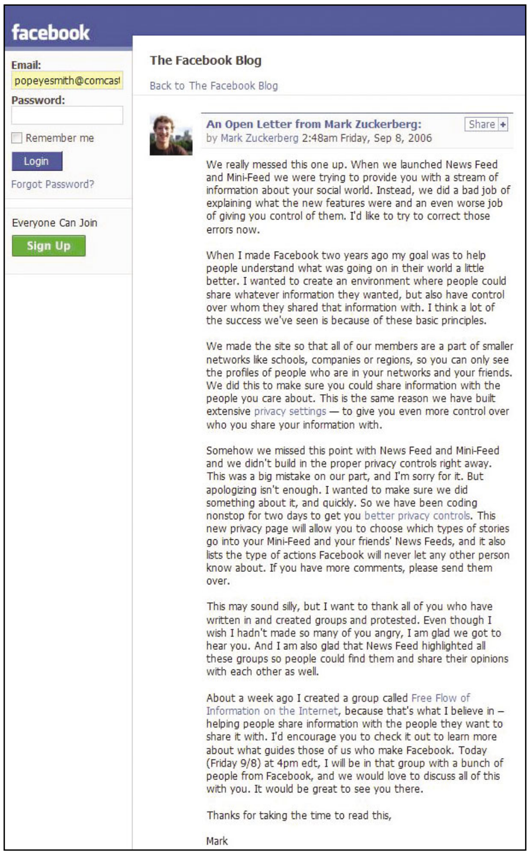
Nothing speaks more to the staying power of social networking than its proliferation among professionals as a part of their work. At Leverage Inc., CEO Mike Walsh helps companies such as Sun, Microsoft, and HP deploy their own social networks. Business publishers such as IDG and Reed Publishing create networks of tech executives and media professionals. "The goal is to allow companies or media companies to build out a customized social network or online community around their brand," he says. Creating social networks within trade publication Web sites adds to the site's stickiness and gives the users a more niche and targeted alternative to the mass sites such as LinkedIn and Facebook.

U.S. Social Network Growth

Almost all of the leading social networking sites enjoyed significant growth in 2007, with Digg, flickr, and Facebook leading the pack.

Site	Unique Users (in thousands) Oct-06	Unique Users (in thousands) Oct-07	% Change
MySpace.com	56,053	71,982	28%
Facebook.com	15,108	32,910	118%
flickr.com	6,153	16,659	138%
Windows Live Spaces	9,512	9,854	4%
WebShots.com	5,938	8,080	36%
FreeWebs.com	N/A	6,443	N/A
AIM Dashboard	N/A	6,410	N/A
Reunion.com	5,920	6,345	7%
Digg.com	1,653	6,286	280%
Bebo.com	2,302	4,442	93%

Source: comScore Media Metrix/TechCrunch



The Facebook Blog

Back to The Facebook Blog

An Open Letter from Mark Zuckerberg:
by Mark Zuckerberg 2:48am Friday, Sep 8, 2006

We really messed this one up. When we launched News Feed and Mini-Feed we were trying to provide you with a stream of information about your social world. Instead, we did a bad job of explaining what the new features were and an even worse job of giving you control of them. I'd like to try to correct those errors now.

When I made Facebook two years ago my goal was to help people understand what was going on in their world a little better. I wanted to create an environment where people could share whatever information they wanted, but also have control over whom they shared that information with. I think a lot of the success we've seen is because of these basic principles.

We made the site so that all of our members are a part of smaller networks like schools, companies or regions, so you can only see the profiles of people who are in your networks and your friends. We did this to make sure you could share information with the people you care about. This is the same reason we have built extensive privacy settings — to give you even more control over who you share your information with.

Somehow we missed this point with News Feed and Mini-Feed and we didn't build in the proper privacy controls right away. This was a big mistake on our part, and I'm sorry for it. But apologizing isn't enough. I wanted to make sure we did something about it, and quickly. So we have been coding nonstop for two days to get you better privacy controls. This new privacy page will allow you to choose which types of stories go into your Mini-Feed and your friends' News Feeds, and it also lists the type of actions Facebook will never let any other person know about. If you have more comments, please send them over.

This may sound silly, but I want to thank all of you who have written in and created groups and protested. Even though I wish I hadn't made so many of you angry, I am glad we got to hear you. And I am also glad that News Feed highlighted all these groups so people could find them and share their opinions with each other as well.

About a week ago I created a group called Free Flow of Information on the Internet, because that's what I believe in – helping people share information with the people they want to share it with. I'd encourage you to check it out to learn more about what guides those of us who make Facebook. Today (Friday 9/8) at 4pm edt, I will be in that group with a bunch of people from Facebook, and we would love to discuss all of this with you. It would be great to see you there.

Thanks for taking the time to read this,

Mark

Oops. Facebook CEO Mark Zuckerberg had to apologize to members recently when an unconventional ad model seemed to violate user privacy.

Publishers are finding that social networking is more popular than the content. "Across the properties, we measure 18 minutes per visit, which is higher than any visits to the home pages," says Walsh. "A lot of the audience is coming for career-related reasons," adds Virginia Hines, vice president and general manager, InfoWorld.com, which maintains a network of thousands of IT professionals. In an economy where people move freely across jobs and companies, being linked in is an essential part of one's advancement even when you aren't actively looking for a job.

Complicated Relationship

And yet for all of the popularity and newfound success of social networking, the long-term implications of the phenomenon remain unclear both for the Internet economy and for the people who use them. In an effort to increase our online network of friends, we expose more of ourselves to people, good and bad. The main early users of the social networks, young people, already seem savvy to their dangers. The Pew study found that 66% of teens with network profiles restrict access to them in some way. But as we share more of our tastes and our thoughts with others online, they become part of a new kind of permanent record that may stay with us more than we like. As social and professional networks meld places such as Facebook and LinkedIn, they leave a record that potential employers can search for embarrassing, deal-breaking revelations about a candidate.

There is a real worry that in many ways social networking will fail as a business, ironically because it is so compelling for users. Both MySpace and Facebook have struggled to turn their massive traffic into ad revenues, in part because advertisers shy away from underwriting sites where individuals are so freely and unpredictably expressive. And even when banners do appear on their pages, social networks suffer notoriously low ad response rates. Users are so into one another that they tend to ignore the surrounding ads even more than usual. As a result, social network publishers are trying to leverage personal profile information in order to target ads more effectively and even use network members as product endorsers. MySpace now uses a "hypertargeting" ad system that gleans a person's tastes from details on their profile page in order to serve them ads that are tailored to their interests. Facebook ran afoul of its users in late 2007 when it launched a "Beacon" that promised to track and publish users' purchases offsite as tacit endorsements of online retailers. CEO Mark Zuckerberg had to apologize to members for what seemed a gross violation of privacy that was poorly explained and executed.

But the next stage of social networking may be one where individual brands such as Facebook and Orkut are irrelevant. One response to the clutter of competing social networks is an open-source movement being spearheaded by Google's Open Source platform. The search giant recently released a series of APIs to developers that will let them create applications that work on multiple networks. But ultimately, the basic functionality of social networking may be incorporated into the software everyone uses, from email clients to calendars and Web browsers. A change in a person's schedule software could be shared automatically across designated members of your address book. If social networking does represent as fundamental a shift in Internet use as some experts suggest, then it could become as ubiquitous and interoperable as Web links and email. In five or 10 years, we may look back upon the current age as a quaint age of discrete brands such as MySpace and Bebo. Instead, social networking may not be a product or a destination so much as a feature baked into all pieces of the computing environment. ▲

by Steve Smith

Infinite Loop

"Reply All" Costs Billions

You know that little "Reply All" button on your email? It's costing the U.S. economy billions of dollars. According to Basex Inc., workplace practices such as pressing Reply All or copying extra people to emails has lowered productivity; it cost the U.S. economy $650 billion in 2006. Although reading an email doesn't take long, workers who stop to read potentially unnecessary emails can spend 10 to 20 times the length of the interruption trying to get focused on their work again. So, if you want your office to be more productive, keep those emails to a minimum. ▲

news.yahoo.com/s/ap/20071226/ap_on_hi_te/techbit_information_overload by Rob “CmdrTaco” Malda

clutter.txt

There are a number of not-so-subtle distinctions between good Web pages and bad ones. As a designer of pages, you have to balance the needs of your many customers; from the administrators to the advertisers to (yes, most important of all) the honest-to-goodness users that you are trying to court, captivate, and convince to return. But there are so many obvious concepts that even experienced Webmasters ignore.

The most common mistake is to bloat up your page with so much crap that your page becomes an incomprehensible smorgasbord of words, graphics, counters, and flashing distractions that take away from the core of your page. In the mid ’90s, this problem was typified by the use of the blink tag and animated gifs, but today the problem is so much worse.

There are those tagging services that clutter your page with a number of keywords. Your readers probably don’t care about them, and if you really think that including them is fooling Google, you are kidding yourself. Give them the axe. The white space will do you good. Tags are great, but they need purpose. Think long and hard before including them.

These days, it’s very trendy to include countless links to encourage readers to submit your story to any one of a dozen popular news replicator services. Although my own domain frequently is included in this palette of icons, you should really avoid these things. They clutter up your page and distract your readers from your content. After all, don’t you want users to read your words and not just jump away to five different news replicators where there are undoubtedly far more distractions? I’m not saying don’t link offsite, I’m just saying that your links should have value to the reader.

Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org. He spends his time fiddling with electronic gizmos, wandering the ’Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.

Next is advertising. This is always a touchy subject because nothing hits the bottom line like those ads. The simple-minded designer knows that doubling the number of ads on your page doubles the number of ads that you serve. And that person should be shot and buried in a ditch outside of town. The truth is that every ad on your page detracts from every other one, as well as your content. It is your job to strike a balance. Readers evaluate the quality of your site by the amount of advertising on the page. The more ads on your page, the more tabloid and cheap you look. Over time this means fewer readers, less page views, and Google Adsense clicks.

Last is subdividing your content into multiple pages. A decade ago, slow Internet connections and small screens might have made dividing pages into bite-sized pieces a logical thing, but if you are doing it simply to serve more ads, you are doing a disservice to your readers. That’s not to forbid you from splitting big pages into segments, but if you are simply doing it to increase your ad inventory, your readers will know.

Part of my job is to evaluate hundreds of Web pages on a daily basis for legitimacy and quality. And I promise you that when I see a page with dozens of ads, 15 referrer icons to other sites, a massive list of obvious search engine-luring tags, and a single paragraph of content followed by links to page 2 though 15, I recoil in terror. I see a page that is whoring itself out, forcing its readers to navigate a sea of garbage to find the single tiny square of valuable visual information, only to repeat the process for 15 more pages. I’m not going to reject the page immediately, but the quality of the writing needs to make up for the inconvenience, and almost no page does. ▲

Contact me at malda@cpumag.com

ROAD Warrior

by Jen Edwards

A GPS For Your Key Ring

The Freedom Keychain GPS 2000 ($99.95) is a Bluetooth 2.0 Class II GPS receiver small enough to include with your keys but powerful enough to connect to up to 51 satellite channels and work for up to nine hours on a single charge. It's ideal for users who don't want a standalone GPS navigation device but would like to add that capability to an existing laptop, PDA, or smartphone. The receiver measures 1.81 x 1.26 x 0.58 inches (HxWxD) and weighs less than an ounce. Software is not included with the purchase, but the receiver works with a wide variety of navigation packages, including BlackBerry Maps, CoPilot Live, Google Maps, MapQuest, and Nokia Smart2Go, among others. USB and car charge cables are also included. ▲

The Freedom Keychain GPS 2000 will ensure that you never get lost again, as long as you don't lose your keys.

Need Your Own Hotspot?

The Cradlepoint PHS300 lets you create a personal hotspot by connecting a 3G EVDO phone or USB cellular modem to a small device that measures 2.9 x 4.9 x 0.6 inches and weighs only 6 ounces. Once connected, it broadcasts an 802.11b/g signal to nearby devices, providing wireless Internet access to nearby laptops, PDAs, and handheld game consoles. The PHS300 supports WEP and WPA encryption and can recharge certain mobile phones.

The included AC adapter powers the PHS300, but it also features a Li-Ion battery that lets the unit broadcast a Wi-Fi signal for up to two hours. An optional DC car power adapter ($34.95) is also available. ▲

Cowon Q5W Offers Touchscreen Entertainment With A Side Of Productivity

Ostensibly, the Q5W is just another PMP in an increasingly crowded category of devices, but it packs enough features to deserve a much closer look. It has a 5-inch, 800 x 480 touchscreen along with both Bluetooth and Wi-Fi. Cowon gives you a choice of a 40GB or 60GB hard drive, which is housed in a metal body for extra durability. The Q5W measures 3.48 x 5.46 x 0.79 inches and weighs just over 13 ounces. It can handle a variety of formats, including DivX, XviD, MPEG, MP4, and WMV video formats; MP3, OGG, WMA, and WAV audio formats; and JPEG, BMP, PNG, and RAW image formats (up to 10MB), as well as text documents. Cowon estimates the Q5W's battery life at 13 hours for audio playback and seven hours for video.

Extra functions let the Q5W control your home media center, and the Q5W sports composite, S-Video, and component ports. The unit can also serve as a USB host, letting you offload and back up files from your digital camera (or, theoretically, any device that uses a USB interface) when you're on the road; USB keyboards and mice are also compatible, which greatly enhances the Q5W's usability.

The Cowon Q5W promises to keep you entertained and productive when you're on the road.

Because the Q5W is based on the Windows CE platform, it can also help you to be more productive; optional browser software with full Adobe Flash support as well as a Microsoft Office viewer, which lets you read Word, Excel, and PowerPoint files, are available as part of a WinCE upgrade from Microsoft. MSN Messenger with voice chat support is also available, and though an internal microphone is included in the body of the unit, you can also use a wired headset to improve the sound quality of the MSN Messenger conversations. The Q5W is available for $549 (40GB) or $599 (60GB). ▲

Belkin, Kodak Team Up To Free Your Photos

The new Belkin Bluetooth USB Adapter with Kodak Picture Upload Technology ($49.99) aims to release your photos from cell phone captivity. Compatible with phones from Motorola, Nokia, Palm, Samsung, and Sony Ericsson, the adapter connects to a PC and automatically downloads photos from your cameraphone when you walk within its 100-meter range.

Users with a Premier membership in the Kodak Gallery (www.kodakgallery.com) can also upload their photos to the site automatically, or the user can simply manually use the adapter to transfer their photos to their computer and then share them online. The peripheral is compatible with Windows XP and Vista. ▲

Belkin and Kodak teamed to produce a Bluetooth adapter that releases your photos from cell phone captivity.

Buffalo Unveils Beefy Portable USB Hard Drive

Buffalo has announced the largest USB-powered portable hard drive available at the time of this writing, a 320GB monster. The drive also uses Buffalo's TurboUSB technology, which is designed to offer faster data transfer rates than other 5,400rpm drives. The hard drive also "floats" inside a shock- and vibration-resistant casing for extra durability.

The drive measures 5.1 x 3.4 x .8 inches, is less than 1 inch thick, and weighs just under 7 ounces. No drivers are needed, and two Windows applications—Memeo Automatic Backup and Secure LockWare—are included. (The drive itself is also compatible with Mac OS 9/X computers.) ▲

Have Phone, Will Travel

Continental Airlines and the TSA have teamed up for a pilot program that allows passengers to use their mobile phone instead of a traditional paper boarding pass. The encrypted bar code, along with flight and passenger ID information, is transmitted to a phone, and a TSA employee scans the bar code, which is displayed on the phone's display, at the security checkpoint. The program is designed to prevent fraud, reduce paper usage, and speed up the check-in process. The program is currently available only at the Bush Intercontinental Airport in Houston, Texas, but if successful could soon become widely available at airports across the country. ▲

Dell, Toshiba Get Touchy

Two entries have recently hit the Tablet PC market, one from an industry vet and another that's just stepping into the market segment. Newcomer to Tablet PCs, Dell unveiled the Latitude XT, a 12.1-inch capacitive touchscreen tablet (either outdoor-viewable or LED-backlit) with a 1.06GHz Intel Core Solo ULV or 1.20GHz Intel Core 2 Duo processor, up to 3GB of RAM, and up to 120GB hard drive or 64GB SSD. The Latitude XT weighs 3.56 pounds and is only 1 inch thick. Connectivity options include Bluetooth, Gigabit Ethernet, 802.11a/g/n, and EVDO (from Sprint and Verizon).

The Latitude XT features both stylus and multitouch input; the pen does not require batteries and features both a "right-click" button and an "eraser" (on the end) and makes input more natural because you can rest your hand on the screen. Dell offers 4- and 6-cell battery options with Express Charge technology. Dell also minimized the AC adapter's size and weight to reduce travel bulk. The Latitude XT is expected to be available by the time you read this.

The Toshiba Portégé M700-S7001X features an outdoor-readable, LED-backlit, 12.1-inch display that accepts both digital pen and touch input. Under the hood, you'll find a 2.20GHz Intel Core 2 Duo processor, 1GB of RAM, and a 5,400rpm 160GB hard drive. (There is no SSD option.) Bluetooth and 802.11 a/g/n are included, as well as three USB and one FireWire port, one Type II PC Card slot, and an IF port. A DVD-SuperMulti drive is included, as well as a Web cam and fingerprint reader. The M700-S7001X starts at $1,699 and comes with a three-year warranty (limited to one year on the battery and AC adapter). ▲

The powerful Dell Latitude XT tablet has a capacitive touchscreen that lets you write naturally, resting your hand on the screen for comfort.

At Your Leisure

The entertainment world, at least where it pertains to technology, morphs, twists, turns, and fires so fast it's hard to keep up. But that's exactly why we love it. For the lowdown on the latest and most interesting releases in PC entertainment, consoles, DVDs, CDs, and just leisure and lifestyle stuff we (for the most part) love and recommend, read on.

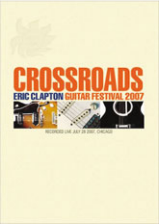
Audio Video Corner

by Blaine A. Flamig

$13.98
ATO Records
www.radiohead.com

Radiohead—"In Rainbows"

The fact that "In Rainbows" is another outstanding musical effort from Radiohead has all but been dismissed by casual fans. Instead, the CD will likely forever be known as the record that changed how major-league bands can do business in the digital age sans record companies. Self-released in October 2007 as a download for whatever fans wanted to fork over, this official CD release of 10 songs is almost anticlimactic in comparison. Still, if you pay for the hardcover edition, you'll definitely get your money's worth. "In Rainbows" easily ranks as one of 2007's best. Although arguably not quite as dynamic as 2003's masterful "Hail To The Thief" or the all-time great "OK Computer" from 1997, "In Rainbows" finds Thom Yorke and company in dead-brilliant mode.



$29.99
Rhino Records
www.crossroadsguitarfestival2007.com

Various Artists—"Crossroads: Eric Clapton Guitar Festival 2007"

We were lucky enough to catch the first Crossroads Festival in 2004 that saw Eric Clapton bring together dozens of the world's greatest guitar players for a weekend of blistering axe grinding to raise money for his Crossroads Centre rehabilitation center. The festival's second go-round took place in July 2007 in Chicago and featured such alumni as Chicago native Buddy Guy, Johnny Winter, John Mayer, Robert Cray, Jimmie Vaughn, B.B. King, Vince Gill, Los Lobos, Robert Randolph and The Family Band, and Jeff Beck. Newcomers included Willie Nelson, Derek Trucks, Robbie Robertson, and Steve Winwood. PBS aired segments of the festival in November, including Clapton and Winwood revisiting their Blind Faith days, but this two-disc set includes hours of terrific performances that didn't make the cut.

$19.99
Universal Studios
www.focusfeatures.com/easternpromises

Eastern Promises

With "A History of Violence" and now "Eastern Promises," director David Cronenberg and Viggo Mortensen are forming an alliance reaching Burton/Depp, Scorsese/De Niro, and Lee/Washington status. As brilliantly restrained as Mortensen's performance was in "A History of Violence," he's as equally mesmerizing here as Nikolai, an enforcer for Russian mob boss Semyon (Armin Mueller-Stahl). As Anna, Naomi Watts is a midwife who helps a teenage girl deliver a baby and consequently comes into possession of her diary, which is full of damaging evidence against the mob. Unflinching and disturbingly realistic, "Eastern Promises" is Cronenberg at his best.

$27.95
Dreamworks Video
www.heartbreakkidmovie.com

The Heartbreak Kid

If you're a fan of Farrelly brothers' gross-out humor, there's plenty of it in "The Heartbreak Kid," which stars Ben Stiller as an unmarried 40-year-old encouraged by his best friend (Rob Corddry) and father (Jerry Stiller) to tie the knot. Unfortunately, the humor leans more toward raunchy than funny and often has little to do with the movie's plot, which finds Eddie marrying Lila (Malin Akerman) after a brief courtship. Upon honeymooning in Mexico, Eddie learns the sweet, unassuming Lila is anything but. When Lila is confined to their hotel room due to a sinister sunburn, Eddie meets Miranda (Michelle Monaghan), a school teacher Eddie believes is the real love of his life. Ultimately, "The Heartbreak Kid" is entertaining but a long way from "There's Something About Mary."

See the full reviews from A/V Corner at www.cpumag.com/cpumar08/AYL

DVD Byte

2/5

Across The Universe

Slings & Arrows: The Complete Series

2/12

Gone, Baby, Gone

Into the Wild

No Reservations

Things We Lost in the Fire

We Own the Night

2/19

Rendition

Lust, Caution

2/26

30 Days of Night

The Darjeeling Limited

Resurrecting the Champ

Unreal Tournament III

Exactly What You Expect *-by Dr. Malaporop*

$49.99 (PC); $59.99 (PS3) • ESRB: (M)ature • Midway • unrealtournament3.com

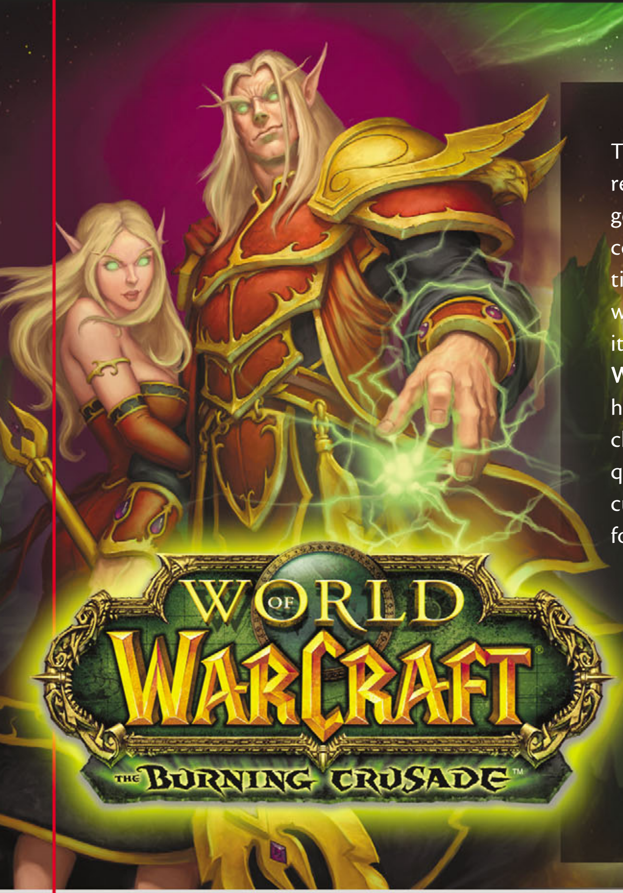
Unreal Tournament has been around for nearly a decade and is in many ways similar to the annual iteration of EA Sports titles. Developer Epic Games doesn't drastically change the gameplay but continues to enhance the core game mechanics in an evolutionary way. For fans familiar with UT, this is the game that you expect. No surprises. As more FPS games move toward great realism, UT3 stays firmly ensconced in providing players with a visceral thrill as they hunt down opposing players in high-speed multiplayer matches.

Gameplay modes, such as Deathmatch, Team Deathmatch, CTF (Capture The Flag), and Vehicle CTF, are exactly what you'd expect in an Unreal Tournament game. UT 2004's Onslaught mode has been replaced by Warfare, a team-based game where each side works in tandem to capture and hold control points along the way to destroying the opposing side's power core. The varied strategies and vehicles (we loved the "War of the Worlds"-inspired Necris Darkwalker) make this "all-new" mode a welcome addition to the game. There's also a new story-based campaign that wraps the aforementioned gameplay modes with an embarrassingly bad storyline. However, it works well enough to introduce gamers to the various gameplay modes they'll encounter with other gamers online.

Unreal Engine 3 is the engine that powers UT3 and has already been seen to great effect in Gears of War and BioShock. Those games looked stunning, and UT3 continues the trend in the visuals department. The effects, animation, and textures are sure to make you pause in admiration (likely leading to your in-game demise) on a high-end PC and scale nicely for more average rigs. The lush visuals don't disguise UT3's similarities to Gears of War with its over-muscular characters and industrial environments.

If a fast-paced multiplayer FPS is what you want, UT3 does not disappoint. UT3 is the best game of its type available today. It won't win converts, but it should satisfy fans of the series and, on the strength of its visuals, draw more licensing deals from developers. ▲

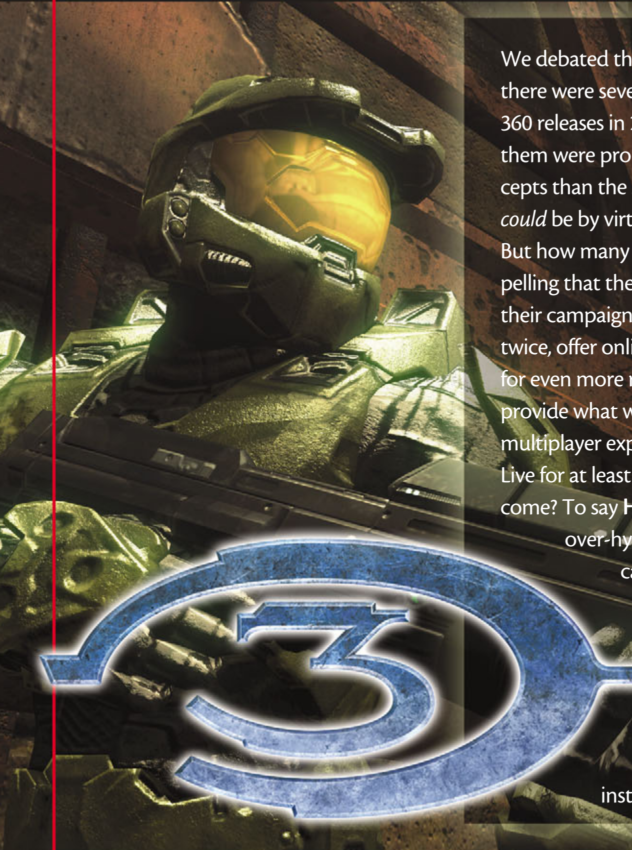
PC Game Of The Year: World Of Warcraft: The Burning Crusade



There were a lot of really good PC games released in 2007, from all sorts of compelling genres and with varying degrees of online connectivity. But in an industry where most titles generate the bulk of their revenue within a few short weeks following launch, it's hard to argue the impact of **World of Warcraft: The Burning Crusade**, a game that has been at or near the top of the sales charts since it hit shelves more than a year ago on January 16. It's also hard to argue with the quality of TBC's content; say what you will about WoW's dated graphics engine and cookie-cutter character and gear models, but the game keeps several million people coming back for more, month after month after month.

Crysis cribs a tad here and there from a former Crytek PC hit (Far Cry), but its stunning visuals and solid gameplay add up to one of the best FPSes to come along in some time. It's also refreshing to come across a title that's fun to play and also actually pushes our hardware a little. Like Crysis, our other runner-up, **World in Conflict**, is a game that helps justify the switch to Vista and DirectX 10. Comfy with DX9? No problem, the game still looks great, and either way, it gives the RTS category a much-needed shake-up: As much as we've enjoyed building monster bases over the years, WiC lets you get right to the fracas, and we can dig it. ▲

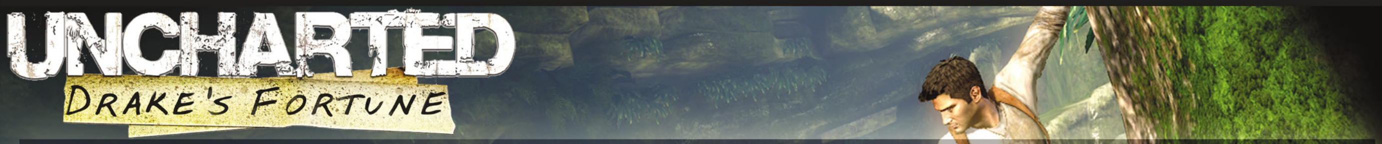
Xbox 360 Game Of The Year: Halo 3



We debated this one a little, as there were several excellent Xbox 360 releases in 2007, and several of them were probably fresher concepts than the second Halo sequel *could* be by virtue of its very DNA. But how many games are so compelling that they push you to finish their campaign modes at least twice, offer online co-op campaign for even more replay value, *and* provide what will likely be the best multiplayer experience on Xbox Live for at least a couple years to come? To say **Halo 3** was little over-hyped is analogous to calling Kim Jong Il a tad unstable, and at the end of the day, it was still just a videogame. But even after three installments, we still have an itch to see what happens next in the Master Chief's entertaining universe.

Although it showed up during the whirlwind of pre-holiday game releases, **Mass Effect** distinguished itself with groundbreaking gameplay and an epic feel that is all too rare these days. The game's blend of innovative dialogue control, interesting tactical combat, and impeccable production values make it unique; the last time we played a game this engrossing that sent us roaming through space to beat the clock and stop an alien apocalypse was 1992, and the game was Star Control II. One other game we strongly considered as a GotY nominee was **Crackdown**, yet another Microsoft Game Studios product. Crackdown suffered from some balance issues and, despite its pedigree—RealTime Worlds developer David Jones had a hand in creating Grand Theft Auto—its driving component wasn't nearly as compelling as GTA's. Nonetheless, your character's progressive super powers make the game ridiculously fun to play, and after all, that's why we play these things in the first place. ▲

Sony PlayStation 3 Game Of The Year: Uncharted: Drake's Fortune



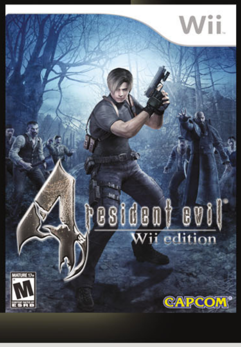
The PlayStation 3 made do without exclusive system-selling games in 2007. The most outstanding titles were nonexclusive third-party fare such as **Call of Duty 4: Modern Warfare** and **Rock Band**, but Sony itself came through with several must-see titles, such as **Ratchet & Clank Future: Tools of Destruction**, **Heavenly Sword**, and **Uncharted: Drake's Fortune**, with the latter our top dog for 2007 PS3-exclusive game of the year.

Borrowing unabashedly from the pages of Indiana Jones and Lara Croft with the addition of Gears of War-style gameplay mechanics doesn't hurt Uncharted: Drake's Fortune. The lush in-game visuals gave us a glimpse of what the PS3 is truly capable of, and the unbridled adventure of stepping into the shoes of Nathan Drake (a descendant of Sir Francis Drake) that leads to the hunt for the treasure of El Dorado makes for an enticing story line. Gameplay is smooth and polished throughout. This is the feel that past Indiana Jones titles unsuccessfully tried to capture. You'll easily be able to complete the game in less than 15 hours, but it's time very well spent. ▲

Nintendo Wii Game Of The Year: Super Mario Galaxy

The discussion for best Wii game of the year was a simple one. Top contenders were **Resident Evil IV: Wii Edition** (from Capcom, the only non-Nintendo runner-up) and **Super Paper Mario**. But at the end of the day, there was no argument over the best game: Nintendo's **Super Mario Galaxy**.

We reviewed Super Mario Galaxy in the February 2008 issue, so the premise and key gameplay elements will already be familiar to you. What becomes abundantly clear playing through the game is the consistently high quality of the levels and the excellent use of the Wiimote and Nunchuk. Also outstanding is the minimal criticism that can be leveled against Super Mario Galaxy. The game achieves everything it sets out to do along with a co-op multiplayer mode that lets someone less familiar with the game still play alongside. Not since Super Mario 64 have we had this much fun with a Mario platformer, and being the most attractive game on the Wii doesn't hurt it in any way. This is the first must-own game for the Wii outside of the bundled Wii Sports. ▲



Cross-Platform Games Game Of The Year: Bioshock

Top-notch nonexclusive, cross-platform titles were in peak form during 2007. Standout titles that come to mind are **Guitar Hero III**, **Rock Band** (which would be our choice for top multiplayer game of the year if we had such an award), **Call of Duty 4: Modern Warfare** , **The Orange Box**, and our cross-platform game of the year, **BioShock**. We address BioShock's many qualities on the next page (spoiler alert?), so we'll use this space to extol the virtues of CoD4, which was so close to winning Cross-Platform Game of the Year that it was essentially a tie. Activision's Call of Duty 4 is a brief (approximately six hours) single-player roller coaster ride with invisible rails. You get an intense adrenaline rush while fighting through the various scripted set pieces that take place in Russia and the Middle East. There is no shortage of memorable moments to reminisce over when you're done. Gameplay is the closest we've felt to being in the middle of a big-budget action blockbuster. Developer Infinity Ward strayed from the (over)tried-and-true World War II theatre and moved the scenarios to the present with a crisis that isn't so hard to dismiss in the context of today's headlines. There's no need to put the game on eBay after finishing it, because CoD4 features the most robust FPS multiplayer experience outside of Halo 3. You'll keep playing long after the endgame. ▲

BIOSHOCK

Runners-up to *Computer Power User* Game Of The Year were **Call of Duty 4: Modern Warfare** (intense), **The Orange Box** (great bang for the buck), **World of Warcraft: The Burning Crusade** (still going strong), and **Crysis** (why PC gaming is cool). All were spectacular in their own way, and many continue to capture our attention in the New Year, but 2K Games' **BioShock** emerged the winner.

BioShock, developed by 2K Boston (formerly Irrational Games), is the spiritual successor to System Shock 2. The game begins with a plane crash and one survivor: you. Making your way to shore amidst the burning wreckage, you find a miniature island with a bathysphere that leads you to the underwater city of Rapture. You begin admiring the environment as the bathysphere makes its way to the depths and the atmosphere starts washing over you as you step out into the eerie underwater city. It doesn't take long to appreciate that the in-game water effects can be viewed as a character: It's the glue that holds the environments together, that maintains the game's dark, dense, *wet,* and moody atmosphere. Venturing forth into the stark beauty of Rapture, you become more intrigued as you discover audio diaries around the city. These diaries help you learn more about the events that led to the unraveling of utopia as you play.

All is not peaceful, and the murderous, stark-raving mad survivors of Rapture will keep you on your toes. Standard weapons are available, but modifying your genes gives you "extraordinary" abilities (both passive and aggressive). The game features two endings, and the brilliance of BioShock comes primarily from the moral choice you'll make when opting to harvest Little Sisters. The *emotional* decision you'll face is a landmark step forward in game design.

See our review in the November 2007 issue to learn more about BioShock. Overall, it's the most powerful gaming experience we had in 2007. Despite a few minor faults, this is the game that moves the dial forward for videogaming and is worth experiencing in person. ▲

BIOSHOCK
$49.99 (PC); $59.99 (360)
ESRB: (M)ature
2K Games
2kgames.com/bioshock

The Cutting Edge

by Barry Brenesal

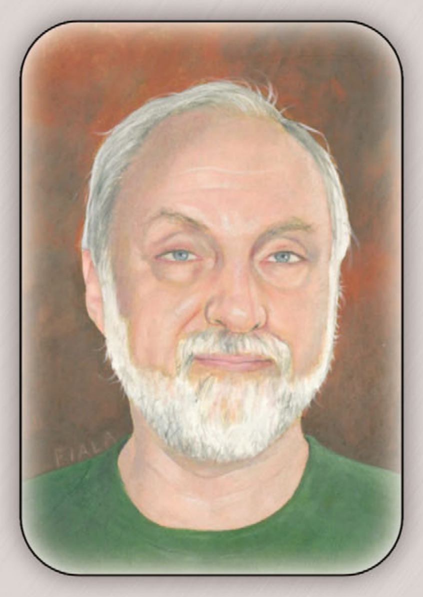
Electronic Instruments I: Theremin's Theremin

You were probably wondering when I was going to get around to the cutting edge in electronic instruments. I apologize for my dilatoriness, and will attempt to do better in the future. In fact, I'll give you two parts on electronic instruments, and this first part will be a twofer in a sense, too. But let's not get ahead of ourselves.

The theremin was certainly the cutting edge of electronic instruments in the early 1920s. Created by Lev Theremin, it wasn't a traditional instrument requiring touch in order to produce and alter the basic sound. Instead, the theremin employed sonic spatial mapping to respond to motion in a nearby electronic transmitter—the human body.

Theremin happened upon the idea for the instrument he modestly named after himself while performing research into proximity sensors on behalf of the Russian government. A physicist of note and amateur cellist, he was also a showman, and not above enough self-promotion to render the facts very hard to verify at this late date. The Great Leader Lenin supposedly asked Theremin to create an alarm system for the Kremlin and then commissioned the manufacture of 600 instruments upon Theremin's demonstration and even began taking lessons. As the story goes, Lenin also sent Theremin on European tours, because sending out a Soviet physicist to give overseas concerts with a new musical instrument was just the way to produce trust in European bankers that would secure tractor assembly loans. Happens all the time.

Whatever may have been the truth at home, Theremin quickly became a novelty act of great interest to the society set abroad, in both Europe and the United States. He performed at numerous concerts, including one in Carnegie Hall that included 10 thereminists he'd trained in traditional classical music. He also arranged commissions for composers to create new music featuring his instrument. Joseph Schillinger, probably best known as a teacher and theorist (George Gershwin, Glenn Miller, and Carmine Coppola were among his pupils), wrote his "First Airphonic Suite" for Theremin. Composer Henry Cowell got Theremin to create another instrument, the Rythmicon, a sort of extended keyboard with electronic rhythm and light attachments. He wrote two works for it, then promptly forgot it. Joe Meek, who wrote the 1961 hit song, "Telstar," actually found and purchased the thing (the Rhythmicon, not Telstar) many years later in a New York pawnshop.



Barry Brenesal has written more than 1,000 published articles and reviews on electronic technology since 1987. His first personal computer was a Radio Shack TRS-80 model 100. It was last seen functioning as a boat anchor.

In contrast to these ephemera was "Fantasy for Theremin, Oboe, Piano and Strings," by Czech émigré composer Bohuslav Martinù. It has several modern recordings to its credit and employs the theremin in a sparsely collaborative rather than solo role. This lets the instrument's distinctive sound be heard to advantage, without permitting its greatest defect—the unvarying quality of that sound—to ever become an issue. Interest in the theremin also came from composers in the motion picture industry. The instrument soon found a niche in films where its voice-like tone was associated for decades with anything eerie: psychological thrillers, science-fiction aliens, etc.

Theremin himself decamped to the Soviet Union in 1938, and word was spread that he'd been kidnapped and then executed. Some accounts, however, suggest that he left the U.S. following charges of tax evasion. Whether willingly or otherwise, the inventor ended up joining the KGB, where he was put in charge of a secret research lab in a labor camp consisting of esteemed scientists. He was very successful there; so much so that he received the Stalin Prize in 1947. I have no idea what prizes, if any, the researchers who were forcibly detained and sent to work under him received.

While there, Theremin developed many spying devices that were certainly cutting-edge for the day. (See! I told you this would be a twofer.) One of his eavesdropping systems recorded embassy conversations by sampling and interpreting the vibrations of window glass, as measured by an infrared beam. He is also credited with developing the first radio transmitter bug. Supposedly, one of these Theremin specials was later hidden inside a carving of the Great Seal of the United States that was presented by a group of Soviet children to Ambassador W. Averell Harriman after World War II. It remained in his Moscow home until the device was uncovered in 1952, which only shows you can never trust these artistic types.

Until next month. ▲

Wax nostalgic with Barry at barry@cpumag.com

Software Tips & Projects

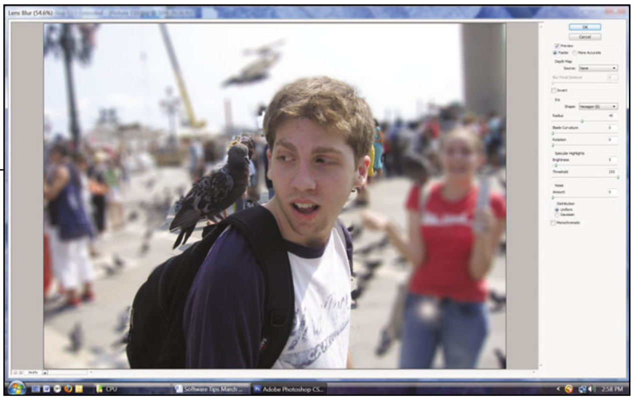
Get In The Picture

If you're like us, you may have received some cool digital imaging upgrades this past holiday and are ready to bump your PC to the next level of multimedia creation. Here in the Tips lab, we were able to get our hands on three of the top tools for digital imaging workflow: a Nikon D80 SLR, a copy of the newest PhotoShop (CS3), and an Epson R2400 pro-amateur photo-printer. What else is a gearhead to do with such a trove of new toys but up his photography game?

Keep in mind that we are using PhotoShop CS3 in this and the following columns on imagery because it is an industry standard. Many of the tools mentioned here (and certainly the principles) are applicable as well in the less-expensive Adobe PhotoShop Elements, PaintShop Pro, and other programs.

Get RAW

If you have a midrange to high-end camera and want to have maximum editing flexibility on your PC, then you should be shooting in RAW mode. It makes for large files (6MB and up with a 10-megapixel camera), but these images give your editing software the most original image information and bypass the inferior processing most cameras apply to other formats such as JPEG.



You can give flat and cluttered old snapshots a telephoto look that isolates the main subject from its overly busy background.

If you do shoot in the JPEG format, however, here are a few camera software tips. Turn off, or set to "0," most effects governing sharpening, color correction, and noise reduction. If you plan to make the most of your shots and keep your options open, then rely on your desktop image-editing software, where you can back out of image processing effects. Once the effects are applied in-camera, they are harder to undo in PhotoShop. The same is true for black-and-white photography. Don't use the in-camera B/W option. Do the conversion on your PC.

To work in RAW in Adobe products such as PhotoShop CS3 or PhotoShop Elements, you will want to download the latest version of the Camera RAW plug-in from Adobe.com (we used version 4.3.1) and follow the instructions for placing the file in the right subfolder on your PC.

Now, when you open any RAW file in CS3 (our Nikon produced files with .NEF suffixes), you will get a panel of image adjustments. Because RAW format avoids the in-camera processing, they sometimes can look softer than processed JPEGs, but they allow for more flexibility when sharpening in an editor. The most dramatic enhancement you can make to an image in RAW is sharpening. Use the Zoom tool in the lower left of the screen to zoom to 100% and find the best-focused part of the image that has well-defined edges.

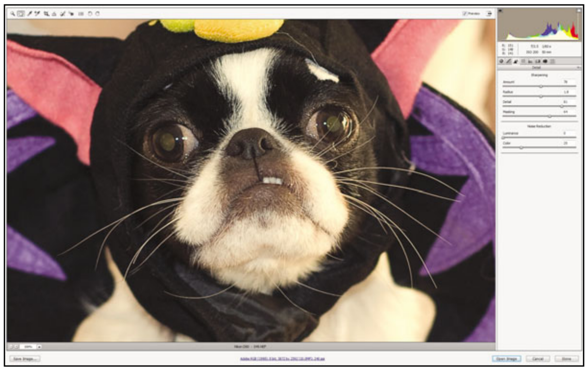
In the RAW toolbox to the right, click the Detail tab. Digital sharpening increases the contrast around object edges. The Amount slide moves to the right to increase the overall intensity of the effect. Try moving that from the default 25 position to 40 or 50. The Radius slider expands the edge area to which the sharpening applies. If the number is too low, then sharpening has little effect, but if you go too high (often above the 2.0 setting), then you are adding contrast to too many pixels away from an image edge and creating a "halo" effect. Halos often look like unnatural extra outlines around the edge of an object. To get

Windows Tip Of The Month

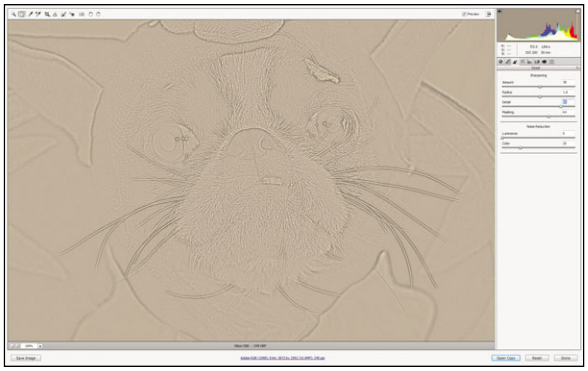
The shortest route between you and a Web site is the name of the site itself. In the address bar of Internet Explorer or Firefox, simply type the basic name of the site without the http://www prefix or .com suffix and then press CTRL-ENTER. Windows will complete the address for you. So, for example, type **computerpoweruser** in the browser address bar and press CTRL-ENTER and you will arrive at our site.

Registry Tweak Of The Month

Paranoid about security? Want to make sure that you leave your PC clean even of the most minute trace of your last session? Try telling Windows to clear your Page File whenever you shut down. In Regedit, go to HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Memory Management and double-click the ClearPageFileAtShutdown Value and change the Value Data to "1." This requires a reboot to take effect.



Using the RAW file format for shooting pictures gives you the maximum flexibility in an advanced editing tool such as PhotoShop.



This editing mask in the RAW sharpening tool lets you apply the sharpening effects to subtler details in the image.

the optimum sharpening effect, raise the Amount slider to sharpen the lines just below the point where the pixel structure becomes evident (i.e. jaggies along curved edges) and then adjust the Radius to further enhance the edges without inducing a halo.

The next control down, Detail, is also powerful, in that it will apply sharpening more deeply into the plane of an image. When set to "0", the sharpening will only apply to the most radical edges of an object rather than its subtler internal structure. So, on the image of Jasmine, our costumed dog will get more of the individual hairs on her snout sharpened as we move the Detail slider up. If you press the ALT key as you adjust Detail, the preview pane shows a monochrome mask that indicates the objects that will and won't be sharpened. The Masking slide at the bottom of this set applies a rougher mask over the general areas of detail in an image, so raising that slider will keep the processing off of unnecessary areas and reduce the chances of digital noise being introduced. Again, press the ALT key when using the Masking slide to show the sharpened areas of an image in white.

When you are done adjusting in RAW, use the Open Image button on the lower right to pull the modified image into the standard PhotoShop editor, where you can make the full range of effects changes.

Beyond The Snapshot

One of the marks of a pro or an educated amateur photographer is the ability to understand composition in a shot and be aware of background. How many snapshots do we have where the background was intruded upon with unwelcome people or hard lines and edges intersecting with the main subject? There are a number of ways to give amateurish snapshots a professional sensibility by isolating your subject from the background.

The first uses selective focus tricks. Choose an image that has a human in the foreground. Select the Lasso tool from the right toolbar and trace around the edges of your foreground object. This doesn't need to be exact but take your time to track a path just to the outside of your main subject's edge. Click the Refine Edge Button, which will make the background go white (for adjustment purposes only) and present you with new tools. Make sure the Preview box is checked so you can monitor your tweaking here. Use the Feather slider to soften the edge of the highlighted area. We use about a 12- to 14-pixel setting for this. The effect will help mute the transition between the background and foreground effect. If you outlined the subject a bit too far outside the edge, you can use the very helpful Contract/Expand slider to enlarge or reduce the selected area. Click OK when done.

Now you invert your selection by using Select and then Inverse. This effectively selects all the background area outside your main subject to which we can apply a range of possible effects. Use the Filter menu to access Blur and Lens Blur. This effect mimics the familiar look of a telephoto shot that throws the background out of focus. The menu that pops open to the right lets you increase the amount of blur by moving the Radium slider to the right. If you feathered and traced your selection of the foreground object well, then you can let the background blur and have the foreground object well-isolated.

The other cool effect to apply to the background is the Radial Blur. In the same Filter/Blur menu from above, click Radial Blur. In the pop-up window, click the Zoom radio button and adjust the slider to about 20. You can play with the box in this window marked Blur by clicking and dragging the lines to the sides or the corners and adjusting the direction of the blur. Remember that pressing CTRL-Z backs out of any changes, so you should be able to experiment easily with applying different effects once you have your figure well-outlined and feathered. ▲

by Steve Smith

NEXT ISSUE: The lost art of black-and-white photography and other imaging tricks.

Infinite Loop

Get Some Fresh Air . . . Indoors

The Plantwall from Green Fortune offers a creative alternative to potted plants: Grow your plants right out of the wall. The size and shape of the Plantwall can be adjusted to fit various spaces, and it comes with an integrated drip irrigation system to make watering a snap. Aesthetic beauty and extra oxygen all rolled into one–this idea has real potential for growth!

www.greenfortune.com/streamgarden/

Warm Up To Penguins

Old-School Gaming

Put your Wii in the closet. Give your 512MB Nvidia card a chance to cool down. Today, we're going to turn back the clock to a time when text on a screen could get your heart pounding as much as any blood-dripping zombie can today. Yes, we're going to take a trip down memory lane and look at some of the old-school computer games still available for Linux systems.

Text-Based Adventures

"You're in a twisty little maze of passages, all alike." Anyone who has ever played Advent, the great, great granddaddy of all text adventures, will recognize this phrase. Advent, known more formally as The Colossal Cave Adventure, was the first real computer game that many geeks ever experienced. Based on a treasure hunt through a series of intricate caves, you tried to collect all the goodies and maximize your score. Finding all the items wins the game, but you couldn't find some items unless you found and used other items appropriately. For the time, it was a breakthrough, but its limited vocabulary and dry descriptions haven't aged well. For example:

"You are crawling over cobbles in a low passage. There is a dim light at the east end of the passage.

There is a small wicker cage discarded nearby.

> take cage

OK

> w

It is now pitch dark. If you proceed you will likely fall into a pit.

> lamp on

Your lamp is now on.

You are in a debris room filled with stuff washed in from the surface. A low wide passage with cobbles becomes plugged with mud and debris here, but an awkward canyon leads upward and west. A note on the wall says, 'Magic word XYZZY.'"

You can try Advent yourself; just install the BSD Games package on modern Linux distributions, and you should find it in /usr/games/Adventure.

In the early '80s, one of the perks of working in the MIT Artificial Intelligence Laboratory was playing Zork. Zork was a quantum leap in entertainment value above Advent. Although it followed the same basic gameplay model as Adventure, the puzzles were much more intricate, the geography huge, and the writing highly amusing. When you made it to the lobby of Flood Control Dam #3, you could do the following:

">n

This room appears to have been the waiting room for groups touring the dam. There are exits here to the north and east marked 'PRIVATE', though the doors are open, and an exit to the south. A guidebook entitled 'FLOOD CONTROL DAM #3' is on the reception desk. There is a matchbook whose cover says 'VISIT BEAUTIFUL FCD #3' here.

>take guidebook

Taken.

>read guidebook

Guide Book To Flood Control Dam #3

Flood control dam #3 (FCD #3) was constructed in year 783 of the Great Underground Empire to harness the destructive power of the Frigid River. This work was supported by a grant of 37 million zorkmids from the central bureaucracy and your own omnipotent local tyrant Lord Dimwit Flathead the Excessive. This impressive structure is composed of 3.7 cubic feet of concrete, is 256 feet tall at the center, and 193 feet wide at the top. The reservoir created behind the dam has a volume of 37 billion cubic feet, an area of 12 million square feet, and a shore line of 36 thousand feet.

The construction of FCD #3 took 112 days from ground breaking to the dedication. It required a work force of 384 slaves, 34 slave drivers, 12 engineers, 2 turtle doves, and a partridge in a pear tree. The work was managed by a command team composed of 234 bureaucrats, 2,347 secretaries (at least two of whom could type), 12,256 paper shufflers, 52,469 rubber stampers, 245,193 red tape processors, and nearly one million dead trees."

To install Zork, do the following:

```
% wget http://almy.us/files/dungeon-linux.zip
% unzip dungeonlinux.zip
% ./dungeon
```

You can see a beautifully hand-drawn map of the Zork universe at almy.us/image/dungeon.jpg.

First Person Shooters (Kind Of)

Just as Advent is the ancestor of all text-based adventures, Hunt the Wumpus is the Stone Age version of an FPS. If you install the BSD Games package, this game comes along with it (/usr/games/wump). If you have more than five working brain cells, you won't be playing it for long, however. It's essentially a logic game: You move from room to room and try to shoot an arrow into an adjoining room when the Wumpus is there. For example:

"You're in a cave with 20 rooms and 3 tunnels leading from each room. There are 3 bats and 3 pits scattered throughout the cave, and your quiver holds 5 custom super anti-evil Wumpus arrows. Good luck.

You are in room 1 of the cave, and have 5 arrows left. *whoosh* (I feel a draft from some pits.) *sniff* (I can smell the evil Wumpus nearby!) There are tunnels to rooms 2, 10, and 20.

Move or shoot? (m-s)"

Enter The World Of Textcraft

It wasn't long before more interesting hack-and-slash games started to emerge. By far, the most popular of them was Rogue. It took advantage of Unix's newly available "curses" library, which let you move the cursor around a terminal (this is back in the days of VT100s and other dedicated CRT terminals). Rogue begat Hack, which begat Nethack (www.nethack.org), the version most commonly played today. Heavily influenced by Dungeons & Dragons, Nethack lets you navigate a character-rendered, 50-level dungeon (randomly generated each time, so it's never the same twice). The fabled Amulet of Yendor lies at the bottom, but orcs, dragons, and all sorts of other monsters stand in the way. And worse, finding the demon-guarded Amulet is only half the problem because you then have to work yourself back up those same 50 levels.

Nethack may look simple on first glance, with its ASCII-rendered rectangular dungeon rooms and monsters represented by letters and symbols, but there's a shocking amount of complexity built into the game. For example, you have a cute little pet (either cat or dog) that will assist you in fighting the monsters (and stealing from shopkeepers), but only if you keep it fed. There are dozens of different potions, wands, scrolls, rings, and staves, and you'll have to figure out which ones to use every time you play (and they're not all beneficial things) There are also dozens of different monsters, all with their own powers and attacks. You also pick a character class and race, which also affects gameplay.

To give you an idea of the game's complexity, let's say you decide to "rob" a shopkeeper (basically, walk out of the store without paying for the items you picked up). Because shopkeepers are as tough as most powerful monsters, direct attack is usually not an option. So, first you kill a floating eye and eat its corpse. This will cause you to randomly teleport. Next, find a ring of teleport control, and you'll be able to select your teleportation destination. Now you can enter the shop, pick up everything you can carry, and teleport out. But you should teleport to the staircase down, because the Keystone Kops (with deadly cream pies) will be after you immediately, not to mention one understandably angry shopkeeper.

Boldly Going Where Everyone Has Already Gone

We'll end our retrospective with a look at the ancestor of all modern space strategy games. When Unix was new and hot, so was "Star Trek." As a result, it was a popular theme for early games. Trek is probably the most popular; it ended up ported to just about every computer and microcomputer you can imagine. In Trek, you travel from sector to sector searching for Klingons, protecting Star Bases, and mining planets for dilithium crystals. You have shields, photon torpedos, and phasers at your command, but watch out because you might be tractor-beamed into combat in a nearby sector just when you're most vulnerable to attack. If you set it for a long game at the hard level of play, you can play for a very long time before you win the game, with many a destroyed Star Base and blasted USS Enterprise between you and victory. As with Nethack, the primitive ASCII graphics belie the complexity of the game.

There are a ton of other games available on Linux from the early days of computing, as well as great modern games, such as TuxRacer. Exploring them can almost make you forget that Xbox 360 down in the living room. ▲

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by James Turner

Infinite Loop

Survival According To WoW

If anyone has ever accused you of spending too much time playing World of Warcraft, tell them you're just brushing up on your survival skills. On their way to school, 12-year-old Hans Jorgen Olsen and his younger sister were chased by a moose. Hans taunted his antlered opponent away from his sister by shouting and then feigned death, a trick he learned in WoW. Olsen lifelessly remained on the ground until the moose wandered away.

www.switched.com/2007/12/10/boy-saves-sister-from-moose-attack-with-skills-learned-in-warcra/

by Mike Magee

Let Everything Connect

Quite a few *CPU* magazine readers might know that the Xerox PARC (Palo Alto Research Center) was responsible for ideas that many of us take for granted these days.

They include the first graphical user interface, the first mouse, and bit-mapped displays. That was a long time ago, and this short list is far from representing the other projects PARC worked on, which include Ethernet and laser printers, among others.

PARC is still working on projects that are way ahead of their time; a quick look at www.parc.com gives an idea of the areas the center is looking at.

One in particular excites me: PARC is working on a set of protocols that allow a network to recognize the capabilities of any electronic gizmo you plug in and automatically tailor itself to making the best use of the gizmo's functions. The idea is for all of this to take place seamlessly in the background, without any action or input from you.

We're all used to hearing the constant beat of the "innovation" drum from firms like Microsoft. A year after the formal introduction of the company's Vista operating system, some are still tearing their hair out trying to make the OS recognize formerly perfectly working peripherals so they function normally.

Buy a piece of software or hardware these days and you really have to be very careful. Will it work with the other elements of your system, or will you find yourself traipsing in the cold down to the superstore where you bought it going through the hassle of either replacing it or getting a refund?

Imagine having a computer system that's intelligent enough to adjust itself automatically to give your new LCD monitor the very best resolution possible at the fastest speed, without you having to worry about drivers and whether your system will support it.

In our last column, we said that people have to invent pretty good software to take advantage of the multiple-core microprocessors that both Intel and AMD promise for us in the next year or two and that until that comes about, CPUs will never be as exciting as they used to be in the good old days of the megahertz wars.

An insider at AMD put it to me pretty graphically. He likened the features the chip firms were using to sell their products as entering the "toothpaste era." In the beginning, there was toothpaste. Then the firms started to offer various types of toothpaste, some with multiple colors and/or flavors in a single tube and some with exotic varieties of mint, all in a bid to differentiate themselves and make you and me choose the one that seemed to offer the most. The manufacturers knew that they were just selling toothpaste.

The folks at PARC are apparently coming up with some interesting ideas, but that means a lot of intelligence underneath the hood with each and every gizmo and PC maker subscribing to similar standards and protocols. It will also require some very clever software that really shows it's brighter than a 20-watt lightbulb. These are two entirely different challenges.

Persuading the entire computer industry to conform to the same standards isn't impossible in broad terms; USB and the Serial ATA bus are sound indications of what can be done. Move a little away from this and there are still niggling mundane problems which mean that if you go to the UK, India, or South Africa, you had better have the right kind of power plug or any amount of massive computing power will just sit there, lifeless, despite your imprecations and special pleadings. Mobile phones, digital cameras, and printers—they all insist on being very different from company to company and there's very little standardisation.

Software is still dogged by different file formats, and the vendors are extraordinarily proprietorial about those. Every computer company wants to lock you in and force you to buy, buy, and buy again—from it, and not from its competitors.

We really do hope the wizards at PARC are beginning to lick some of these problems into shape. If and when they do, they will have to persuade the rest of the world to join in. Good luck to them, I say. ▲

Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

Send rumours to "Mad Mike" Magee at mike@cpumag.com

by Rahul Sood

Hyderabad

This December through January, I traveled with my family throughout India. We spent two weeks in an extremely modest environment—a roadside Super 8 Motel would be five-star accommodations in comparison. We toured villages where we were welcomed with open arms into modest homes where more than 20 people sleep in candlelit 8- x 10-foot rooms with no air conditioning. They cook in a little courtyard, and restroom facilities are in the back in a ditch with wooden planks. Temperatures hovered around a steamy 32 degrees Celsius, in the middle of winter.

It was an amazing experience. Not only were all the people we met gracious, but they were also seemingly content with their lives. The village children were overjoyed as I took pictures of them with my digital camera and was instantly able to show them the results. It became clear that the children of these villages are voracious learners; when given an opportunity to study, they eat it up. They dream of something bigger, and believe it or not, none of the children we met had *ever* seen a digital camera.

My father-in-law lives in Hyderabad, India, and has founded about 13 colleges and schools there, mostly for the underprivileged. We went to one of the colleges to check out the computer and mechanical engineering programs, as well as various other departments. He introduced me to a number of professors, and in the process they asked if I could do a talk there for their graduating class.

I wasn't sure what I was going to speak about at first because I really didn't know much about the audience, but as I met a few of the students coupled by what we saw in the village, it started to become clear.

When you think about IT in India, two things naturally come to mind: call centers and database development. But there are other vastly unexplored areas.

So I spent a few days on and off campus talking to people, researching online, and touring here and there. I was very impressed by what I found, both in terms of the base of knowledge in the area and the pragmatic way in which the people we met go about solving the problems they face.

Pollution is a huge problem there, and I met a professor who made it his life's work to research new ways to power motor vehicles. His Air Car runs completely on air, recycling the air via the exhaust back into the system, and currently uses a small tank of compressed air. The inventor wants to swap out the cylinder of air in favor of an air pump, or as he described it, a breathing apparatus that works like a lung. The concept may seem way out there, but he has a working model and it's quite impressive. Although it is only a 5hp model, it would be simple to create a 20hp prototype using a similar method.

Rahul Sood's love for computers started at the young age of 11. Much to the shock and dismay of his parents, he ripped apart his brand-new Apple //c and painted it red before turning it on. His parents' dreams of having a doctor for a son were shattered when college drop-out Rahul founded what is now one of the most respected high-end computer companies in the world, Voodoo Computers.

A car that runs on air, you say? That is correct. I daresay anything is possible, and this was just one of a few research projects that I got to see firsthand. After much deliberation, I knew what I would talk about in addressing a group of Hyderabad graduates. I wanted to give these students something to think about going forward. They are living in a society that's highly commoditized and are naturally put into positions where their talents are used as a commodity to compete against richer countries. While this can be a highly profitable business, it can also be bad when the people end up commoditizing themselves and devaluing their own work.

So my talk consisted of a few ideas that many of us could stand to keep in mind:

- Find something you're passionate about and make it your area of expertise.
- Find a problem that needs solving in your area.
- Don't fall into the trap of commoditizing yourself.
- Don't face a giant head-to-head; rather, find ways to complement the giant's strengths so that eventually you will have the potential to exit or partner.
- Constantly revisit your strategy and see if it makes sense. (Thanks to Mike Perkins for this one!)

Well, that's it for this month. I took some great pictures of our expedition that you can view at vdhd.zenfolio.com. ▲

Send your opinions to this opinionated guy at rahul@cpumag.com

CPU

Look For *CPU* At These LAN Parties Across The Nation!

02.15.08
PDXLAN 11, Portland, OR
www.pdxlan.net

02.16.08
AsylumLAN, Evansville, IN
asylumlan.com/lanparty

02.22.08
Netwar 15.0, Omaha, NE
www.netwar.org

02.23.08
Appalachian State University Gaming Club, Boone, NC
www.gaming.appstate.edu

CarolinaCON, Greensboro, NC
www.ncgaming.com

03.07.08
Digital Overload, Providence, RI
www.digital-overload.com

03.08.08
Whempy's LAN Party,Columbus, OH
whempyslan.org

03.15.08
Iron Storm 7, Castle Shannon, PA
www.pittco.org

04.01.08
theGXL, Millville, NJ
www.thegxl.com

04.11.08
LAN OC, Ohio City, OH
www.lanoc.org

04.19.08
Appalachian State University Gaming Club, Boone, NC
www.gaming.appstate.edu

NEARFF, Searcy, AR
www.harriscustompcs.com/nearff

Whempy's LAN Party, Columbus, OH
whempyslan.org

Spring 2008
Xodus, Rochester, NY
www.egslan.com

05.01.08
NVGASUPERCON, Albuquerque, NM
www.nvgasupercon.com

05.10.08
Whempy's LAN Party, Columbus, OH
whempyslan.org

05.26.08
NEXLAN, Spokane, WA
www.nexgenconsulting.net

06.21.08
Whempy's LAN Party, Columbus, OH
whempyslan.org

07.19.08
Whempy's LAN Party, Columbus, OH
whempyslan.org

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Technically Speaking

An Interview With McAfee's Dave Marcus

Dave Marcus currently serves as security research and communications manager for McAfee Avert Labs. He formerly served as senior security strategist for McAfee, with more than 10 years of technical experience in network solutions, information technology security, network performance and integration, and e-learning solutions, as well as management and consulting.

by Barry Brenesal

CPU: McAfee has recently released its Virtual Criminology Report for 2007. What methodology did your company employ to arrive at the report's talking points and conclusions?

Marcus: One thing that we've always felt was important in developing the Virtual Criminology Report was to integrate writers who were not just McAfee people. We contacted a number of third parties in security research, but outside of the company. As a result, when we discuss conclusions or trends, it's not simply something McAfee is saying. It's also something that the greater law enforcement and academic security communities are saying.

CPU: How many people were involved in developing this report?

Marcus: Fourteen. Probably the biggest names there is Dr. Ian Brown, a research fellow at the Internet Institute of Oxford University—as well as Lillian Edwards, who works for the Institute for Law and the Web, the University of Southampton, and Sharon Lemon, head of e-crimes in the Serious Organized Crime Agency. It's fair to say that a lot of people outside of McAfee came to many of the same conclusions that we ourselves did. That probably gives it a bit more validity.

CPU: There were three major findings mentioned in the report. The second of these begins, "There is an increasing threat to online services because of the growth in sophistication of attack techniques. Social engineering, for example, is now being used in conjunction with phishing techniques . . . " Social engineering? Could you give us some context, here?

Marcus: Essentially, when you talk about phishing, phishing sites, and even spam, they're really a lot like that: someone who is writing a very well-crafted message in such a way that they get you to take an action. It's not just a matter of double-clicking on something, either. It could be trying to get you to enter private information into a Web form. What it boils down to is finding the right way to get you to provide them with the answers they need. It's the same kind of social engineering that regular confidence people would use, just transmitted to the digital world.

CPU: So it's a culturally conceived mousetrap that's being deployed online, now?

Marcus: Yes, I would absolutely agree with that.

CPU: Continuing with your report's conclusions, "The third and final trend is the emergence of a sophisticated market in software flaws that can be used to carry out espionage on critical government infrastructure networks. The findings indicate a blurred line between legal and illegal sales of software vulnerabilities." A few things to ask, here. What do you mean, first, by a market in software flaws?

Marcus: This is actually something that has been going on for a while in the computer underground: the buying and selling of vulnerability and exploit information. For instance, let's say Group X finds a vulnerability in a Microsoft Office format. They could either do the ethical thing and disclose it to Microsoft, who then releases a patch—and Group X gets credit—or they can sell it to a bounty program or organization or trade it on the underground for a specific dollar amount. Some of the more nasty vulnerabilities, like a code execution vulnerability in Internet Explorer, can go for $20,000 or more. I've seen them for sale up to $70,000.

CPU: The report goes on to mention that "companies buy these software flaws. Examples including Tipping Point (owned by 3Com) and iDefense (owned by Verisign)." There is also a statement in your report that these disclosures should be made solely in an ethical spirit, rather than with concern for notoriety or financial reward. Well, sure—but to use Microsoft as an example, does it regularly give its software away to the public and to companies because everybody needs it, or might not be able to afford it? Isn't it part and parcel of the nature of capitalism that everyone engages in financial transaction for their own betterment—hopefully, under laws that will prevent them from making matters worse for everybody else?

Marcus: Certainly, a researcher should be compensated in some way, shape, or form, but our biggest issue revolves around the putting at risk of the greater computing community. When you're releasing vulnerability information prior to a vendor releasing a patch, you're putting people who use that software at risk. That really is the crux of the problem. Do it in such a way that you work with the vendor within their Q&A period of time so that you can get credit for being the finder; then they can issue the patch, and nobody gets hurt. When the researcher goes outside the vendor of choice, what ends up happening is that information either gets released early, with proof of concept code. That leads to an exploit, which in turn leads to malware getting inserted on systems.

CPU: Are people whom you term vulnerability hunters, though, being compensated for the research from the developers? Are they monetarily compensated if they approach Microsoft and say, "Hey, there's this vulnerability within your latest patch to Internet Explorer"?

Marcus: They're getting a huge amount of credibility and publicity within the security and software communities when they're named directly in the Microsoft patch release. Microsoft is very good about that. If you look at nearly every patch release resulting from research done by somebody outside the company, the person who found the vulnerability is mentioned very prominently.

Whether or not they get paid, I don't know. I don't believe they get compensated by Microsoft. They'll get compensated oftentimes by bounty programs, like Zero Day Initiative or the Vulnerability Contributor Program. But once again, that is a matter of working outside rather than directly with the vendor.

CPU: Do you have any figures on how many vulnerability hunters there are working at this time, on the PC side of things?

Marcus: We've never been able to get a specific count on that. A lot of times they will go through an organization so that it will be the XYZ Group who submits a batch of vulnerabilities. Then, too, when you see a lot of postings on underground sites, everybody has a nickname or handle, so it's impossible to tell if there's a core group of them or if it's tertiary people. I wish we could get an accurate count on them.

CPU: Has McAfee ever employed anybody who was at another time a vulnerability hunter?

Marcus: There was a period of time when that occurred—when, for example, we acquired our Foundstone division. They did a lot of vulnerability research. We differ in the fact that the way we find vulnerability information is through content creation. We don't have teams dedicated to the finding of vulnerabilities, but we do find dozens per year from our primary job of writing content and protection. But the Foundstone side of the house definitely was engaged in vulnerability research.

CPU: The Virtual Criminology Report credits a piece in the reputable German daily, *Der Spiegel*, for noting that it was thought the mainland Chinese government had hacked into the systems of three German ministries with spy programs. Then you state that the German Federal Office for the Protection of the Constitution prevented a further 160GB of information from being transferred to China. I was confused a bit because the initial remark about the hacked German ministries wasn't presented by you as a fact, only as something mentioned in *Der Spiegel*. Wasn't its accuracy previously established before being used in your report?

Marcus: There's a lot of cloudiness around the issue of Chinese hacking. The information points back to Internet addresses that exist there. Who owns those addresses is the biggest bone of contention, right now. When we speak in broad terms about the hacking being "supposedly from" China, it is because the Chinese government has gone to great lengths to state they aren't engaged in any kinds of hacking activity. But we point back to this traffic and address information that clearly points to regions in China, itself. That's why fuzziness enters the language when you see terminology such as "reportedly" in use. Who owns the actual addresses? Is it sponsored or state-run? Is it a company or a group of individuals?

> Some of the more nasty vulnerabilities, like a code execution vulnerability in Internet Explorer, can go for $20,000 or more.
> —Dave Marcus

CPU: Your report notes that China has been involved in several major controversies of this kind over the last year.

Marcus: Absolutely. This particular topic has caused a significant amount of controversy, yet it's valid information based upon the facts as we have them and trends that we've seen during the year. We've observed time and again an attack that forensic work traces back to blocks of addresses in China. It's impossible to get around that.

CPU: Each one of the examples you provide concludes with a statement that the Chinese government disowns any responsibility for this hacking. Have they made any efforts that you're aware of to try tracking down the culprits?

Marcus: They've gone to lengths to say, "It's not us as a government that is doing this, and we're just as much a victim as anybody else is." But I'm not aware of the flipside of their having actually done any research to determine who is doing it. So if they are working on this, they aren't being very public about it.

CPU: It's not just government offices that are under attack, is it? One of the previous guests we've interviewed, Jon Birnbaum, has since commented upon a number of spam attacks on his site originating in China. So have others. Although only anecdotal evidence, this would seem to indicate that we're looking at something that's a much more diversified problem than one limited to attacks on a federal level.

Marcus: One thing that the report discusses, as well as some of our other publications, is the global nature of malware in general. Just because you get spam in your inbox in the United States does not mean it comes from the United States. A good botnet is certainly a global phenomenon, and most spam comes from botnets. They are located all around the world. A lot of the same spam runs that you see come from five, eight, 14 different countries.

CPU: For the sake of those who remain blissfully unaware, could you explain what a botnet is?

Marcus: A **bot** is a very simple program designed to execute a series of commands. Those commands can vary from sending out a packet or email to looking for a password. A series of bots are members of a greater **botnet** which can vary in size from five or 10 to 1,000 or 10,000 to a million. Depending upon how much spam you want to send, that determines how many bots you use.

CPU: When a person opens an email that uses an exploit in Internet Explorer allowing the execution of a script, their own computer becomes a bot in this botnet, correct?

> When you look at a botnet or spam,
> it's a global problem,
> and to be successful in dealing with it,
> it must be addressed globally.
> —Dave Marcus

Marcus: Oftentimes, that is correct. Upwards of 80% of the spam is generated from bots, and in many cases, bots will attempt to procreate by installing themselves on other machines. That is certainly a prevalent technique that malware writers use.

CPU: What is this we read in the report about botnets and malware tools now being bought and sold? Is this common?

Marcus: Oh, certainly. This is a phenomenon that has been going on for quite some time. Usually, a **bot herder**—the person in charge of the botnet—will rent out periods of time on his botnet to other people. If you want to send out a spam run or spyware, you can get time on these botnets. The tools in turn are very freely available. A good Google search will actually get you lots of different bots and spyware or Trojan creation tools. There are also sites on the underground where you can buy them with support contracts, just as you would buy regular software.

CPU: It sounds like a direct descendent of the viruses that back in the 1980s came out of a high school in Plovdiv, Bulgaria, with numerous underground Web sites offering the content for download.

Marcus: A great old-school comment on the Bulgarian connection. Not a lot of people make that reference. It's absolutely the same kind of paradigm for tools that are available. What's different now is the professional nature of malware writers, their drive to either make money from that malware or with it. They will not only provide support contracts but also support Web sites. It really has grown to be a recognized industry in many parts of the world.

CPU: So this kind of activity isn't illegal everywhere? Are there places where this can flourish with impunity?

Marcus: There are certainly havens.

CPU: And it does state in your report that there would be an increase in the next few years in safe havens for cyber criminals and an increase in crackdowns on the criminals, as well, regardless of location. That would imply ramped-up international laws, wouldn't it?

Marcus: I truly think that in the long term that is one of the significant aspects of the report. When you look at a botnet or spam, it's a global problem, and to be successful in dealing with it, it must be addressed globally. I think we're starting to see moves in that direction.

by Kristina Spencer

Under Development

A Peek At What's Brewing In The Laboratory

Shaken & Secured

Creating a secure wireless link between electronic devices is fraught with potential. At best, it's a potential annoyance, as users struggle to enter PINs or complete other time-consuming authentication protocols. At worst, it's a potential danger: You accept a malicious transaction, believing it to be from a trusted source.

Professors Rene Mayrhofer and Hans Gellersen at Lancaster University have developed what they believe is a better authentication method between small gadgets, designed to provide a secure connection with minimal effort. They call it "shake-well-before-use."

With Mayrhofer and Gellersen's system, one can initiate a secure link between devices by simply holding them in one hand and shaking them vigorously for a few seconds. The prototype software compares accelerometer data captured by each device; if it matches, a link is established. The researchers maintain that their process is not only quicker and easier, it's far more secure than current authentication methods. It's very difficult to create identical accelerometer readings if the devices are not held in the same hand.

"What we can provide with this approach is a method that is both secure and intuitive for pairing small, mobile devices," explains professor Mayrhofer.

The team is working to optimize the data analysis algorithms to improve their authentication method while also contacting mobile phone manufacturers to explore the option of getting their technology into retail devices. According to Mayrhofer, the length of time until devices equipped with the authentication-by-shaking system become available "is highly dependent on the interest of device manufacturers. Technically speaking, it could be integrated into the next generation of phones and headsets with a time frame of less than six months. Realistically, it will be longer." ▲

Say goodbye to searching device lists and PINs. A new wireless authentication method requires only a vigorous shake to create a link.

Nanotube Radio

With the advent of the iPod and other small music players, we've become accustomed to carrying our tunes in our pockets. Now, scientists at the University of California, Berkeley, in conjunction with researchers at the Berkeley National Laboratory, have invented a literal "nano" in the form of the world's smallest functioning radio, made from a single carbon nanotube—10,000 times thinner than a human hair.

The team, led by physics professor Alex Zettl, conceived the idea of the nanoradio after creating a nanotube force sensor. Noting that carbon nanotubes are very sensitive to extremely small forces, becoming even more sensitive at their resonance frequency (which happens to fall within the same frequencies of radio, cell phone, and GPS broadcasting), Zettl and his team decided to try to use a nanotube to make a radio.

The radio consists of a carbon nanotube mounted to one electrode in close proximity to a second electrode and a power source, all contained within a vacuum. When the research team broadcast a radio wave at the nanotube's resonant frequency (which can be mechanically tuned while the radio is operating), the nanotube began vibrating. Then, they applied an electric field, causing the nanotube to emit an electric current. The nanotube's movement amplified the current causes as well as modulated the radio signal. In this way, the nanotube served as all parts necessary for a functional radio: antenna, tuner, amplifier, and demodulator. In tests, the nanotube radio was able to receive a music broadcast from several meters away and could maintain a lock on a given channel for minutes at a time.

The team believes its invention has applications beyond being simply a very tiny AM/FM receiver. Because of its size and ease of manufacture, nanotube radios could become an integral part of wireless sensor networks, be inserted into cells in the form of radio-controlled biomedical devices in the body, and offer new ways of correcting hearing impairments.

Zettl says that the next steps in his research include defining operation limits of the radio and integrating it into other electronics and biosystems. The laboratory is seeking out companies in the private sector to commercialize the technology, and Zettl believes the first commercial nanoradios could appear within five years. ▲

How Does Your Wallpaper Grow?

If you've ever gone through the painful and messy process of replacing old wallpaper, you'll appreciate a new technology being developed by Swedish researchers. No, it's not an easy-on/easy-off adhesive; Göteborg University graduate student Sara Ljungblad and her colleague Marcus Forsmoo are creating a computer program that produces unique flowered wallpaper from your cell phone snapshots that grow over time. (And you can change it whenever you want simply by taking a new photo.)

When a user sends a photo, or series of photos, from her cell phone to the application, the images are analyzed and assigned a value based on properties such as color, brightness, and contrast. The program then uses that value to create one of six flower shapes that also contains enough of the photo(s) to be recognizable.

The flowers are then projected onto the wall, positioned by the user via a system called Mimio. Then, the flowers become an autonomous animated garden, growing and even subtly swaying as if touched by a light breeze.

Ljungblad hopes that a future iteration of the program will utilize a technology other than projection to get the flowers onto the wall. "The current hardware was the quickest way to implement the application, but it would be interesting to look into positioning solutions other than the Mimio system that still allow users to physically place the flowers."

Sadly, if you're dying to change your wallpaper in the near term, you'll have to buck up and rent the steamer. The program is still a prototype, and Ljunglad has no short-term plans to commercialize the system. ▲

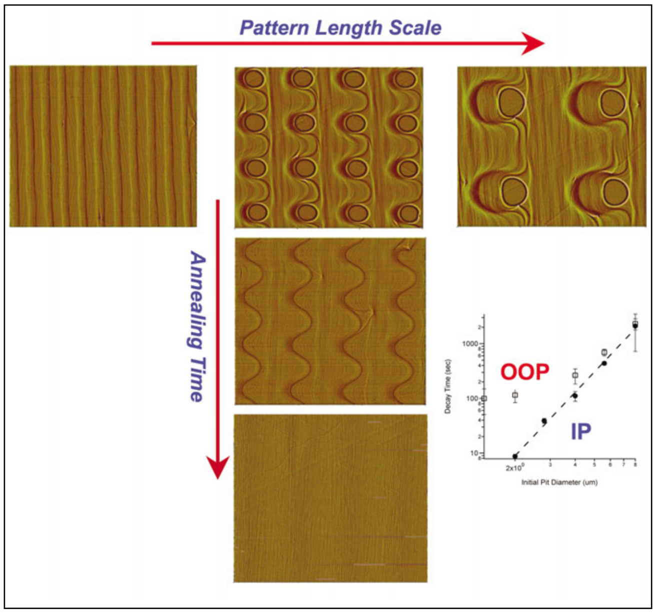
Helping Nature Help Us

Left alone, nature is capable of creating some pretty amazing and complex structures. But Associate Professor Ray Phaneuf and his team at University of Maryland's A. James Clark School of Engineering have discovered that with some additional direction, nature may be capable of producing structures in forms that are not only complex and beautiful, but also double as natural, nanoscale computer components.

The scientists have fabricated templates which, when used with materials such as silicon and gallium arsenide (commonly found in computer and cell phone parts, respectively), guide the natural self-assembly process on the atomic level so that the resulting structures are ordered in a very specific way. Although templates are still in the early development stages, they could one day be used to mass-produce tiny, identical components quickly and efficiently. Because the templates could be reused many times, it would also reduce the cost of creating the components.

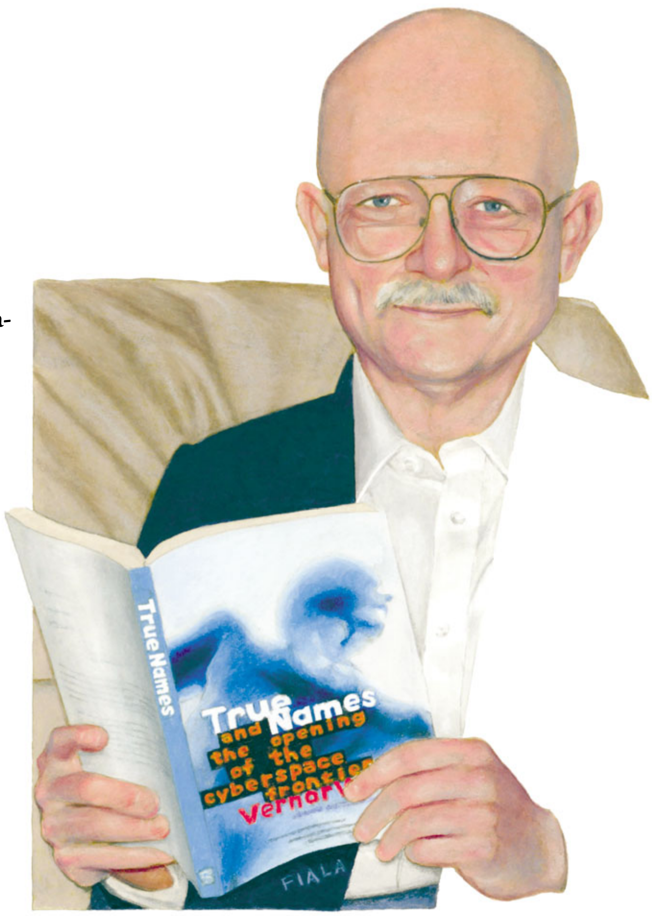
Phaneuf's research team creates the templates in one of two ways: photolithography, in which the template is selectively exposed to light and then chemically developed, and nanoscraping, in which an atomic force microscope etches a pattern into the template.

In a recent press release, Phaneuf compares the way in which the templates work to using a wax "template" to direct a pattern for liquid spilled on a table: "Now when you spill the liquid onto the table, it collects in the pattern you scraped into the wax. It assumes the form you want it to take. When we apply this idea to manufacturing nanoscale computer components, collections of atoms become ordered, accessible, controllable, and reproducible—characteristics crucial to their use in high-tech devices." ▲



Researchers hope to one day use templates, such as those that created these structures, to guide self-assembly of computer components at the atomic level. (Credit: Clark School of Engineering)

Q&A With Vernor Vinge


True Names
True Names and the opening of the cyberspace frontier
Vernor
FIALA

Vernor Vinge's science fiction novels have always had a touch of realism when it comes to computer technology. His 1984 novel "True Names" predicted what life would be like in a kind of "cyberspace." For nearly three decades, he taught math and computer science at San Diego State University, retiring in 2000 to write science fiction full-time. He recently gave a talk to a number of chip engineers where he predicted a world of "digital plankton," where chips build awareness into all things. But he warned that failure scenarios, such as a slowdown in Moore's Law, could get in the way of that vision.

Q **It's interesting that you have a computer science background. How did it help your science fiction?**

VV It's near ideal for hard science fiction, or science fiction that is technology-oriented. It's not necessary for writing science fiction. But it's a strength. Every writer has a strength or weakness. That was my strength. I could sell on the basis of that while I worked on improving my weaknesses. Over the years, it helped in both directions. What I was doing at school helped me think about stories.

Q **What was the earliest manifestation of computer science showing up in your science fiction?**

VV The first story that I ever wrote and sold was about intelligence amplification by using a computer to increase the intelligence of a chimpanzee. I wrote that in the summer of 1963, the summer I got out of high school. There is optical computing on it and all sorts of cool stuff. I had never taken a computer course yet. That meant I didn't know what was impossible.

Q **Did that serve as inspiration for a lot of writers that came afterward like Johnny Mnemonic, where they have chips in brains?**

VV I am not in a position to say. I am very pleased by stories that are similar to my story "True Names." It's hard to say in terms of influence. It's perfectly possible for two different people to be inspired in a similar way by the general environment they are in.

Q **Can you talk about the "digital Gaia" theory?**

VV It's a straightforward extrapolation of the embedded microprocessors that everyone is aware are in so many things like our automobiles. Now we are entering an era where these embedded micros talk to each other because they are networked. It's like having an Internet below the Internet. It's like having a digital plankton layer. Hence the name digital Gaia. We are also close to having technologies where the embedded micros know where they are. If an object knows where it is and it can communicate with its neighbors, then it can communicate with anyone by storing forward. There are all sorts of issues for technology and society where an underlying Internet can solve problems in a uniform way. We have all sorts of technologies for positioning and sensing. This is possible.

Q **You think that is all doable?**

VV Yes. There are things in the story that are harder to swallow than that. It's all incremental. There are some things like space flight where you had to make an enormous investment before you got the trillions of dollars in payback. This is all incremental investment and build out. It can be broken. But it has a lot of power behind it.

Q **You talked about scenarios that could prevent digital plankton from ever happening.**

VV My first scenario was a technological one, where Moore's Law slows down as we hit the wall on progress. But the others were things that happen very slow or very fast and make further progress politically and economically unpalatable.

Q **One scenario was the hardware gets better and software doesn't catch up.**

VV The hardware gets better and better. I can remember being onsite once, and one of the engineers said it's impossible to write a program longer than 50,000 lines without having unsalvageable fatal bugs in it. The symptom of that would be huge software projects that collapse of their own weight. ▲

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